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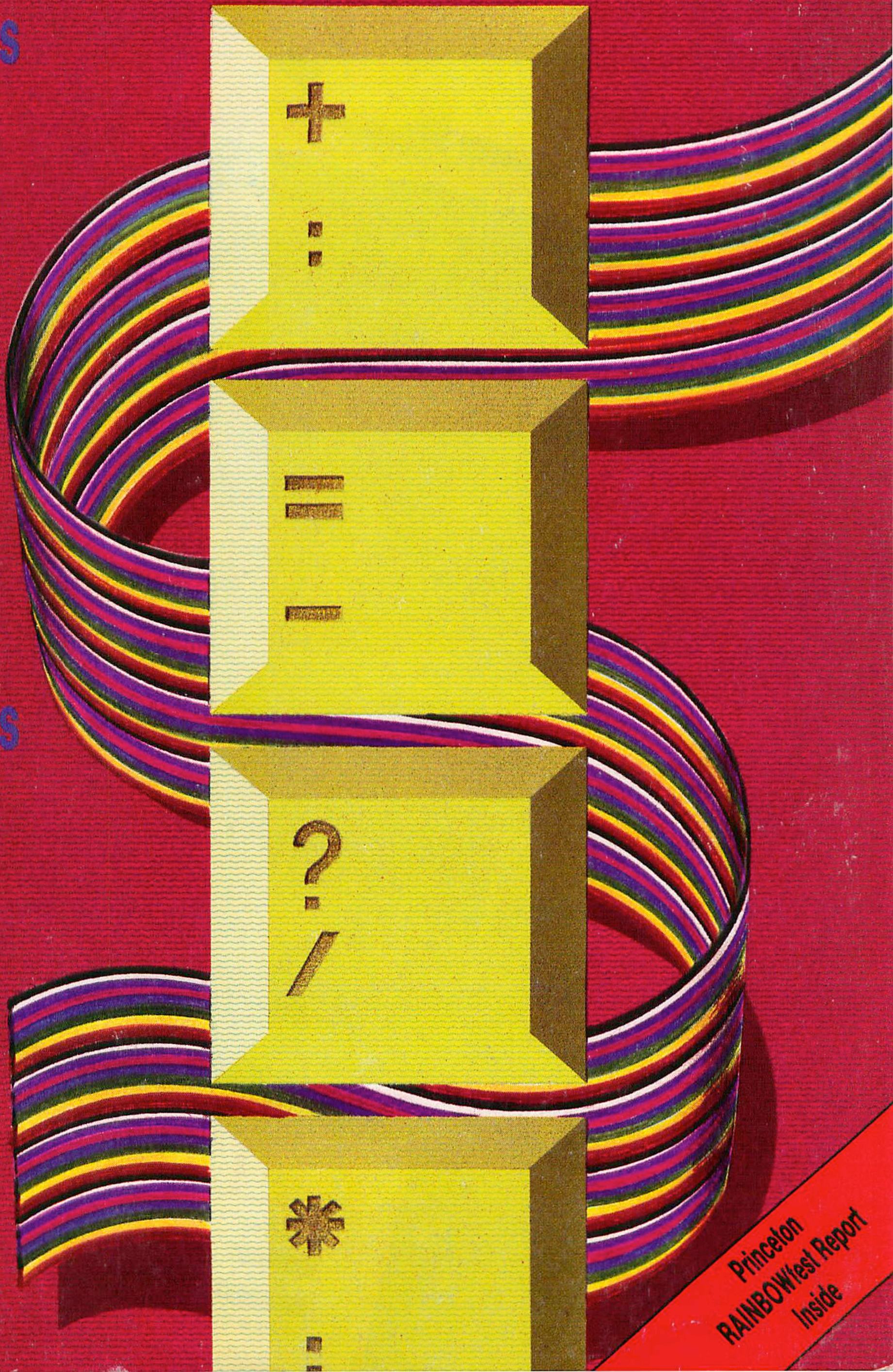

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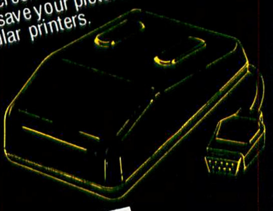

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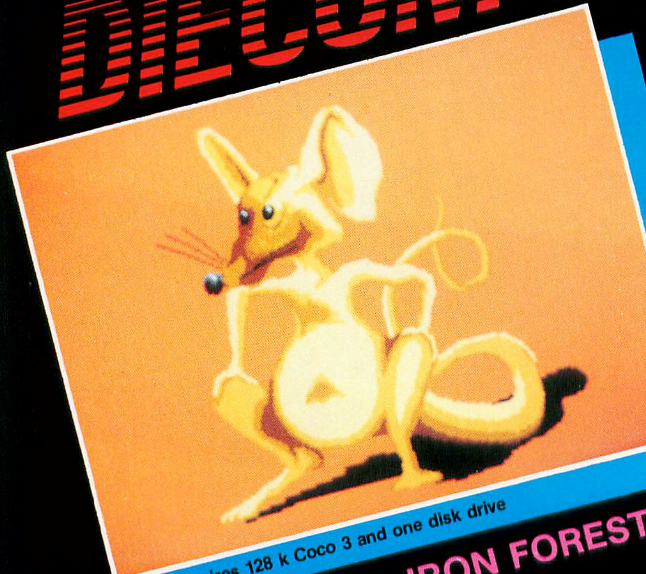

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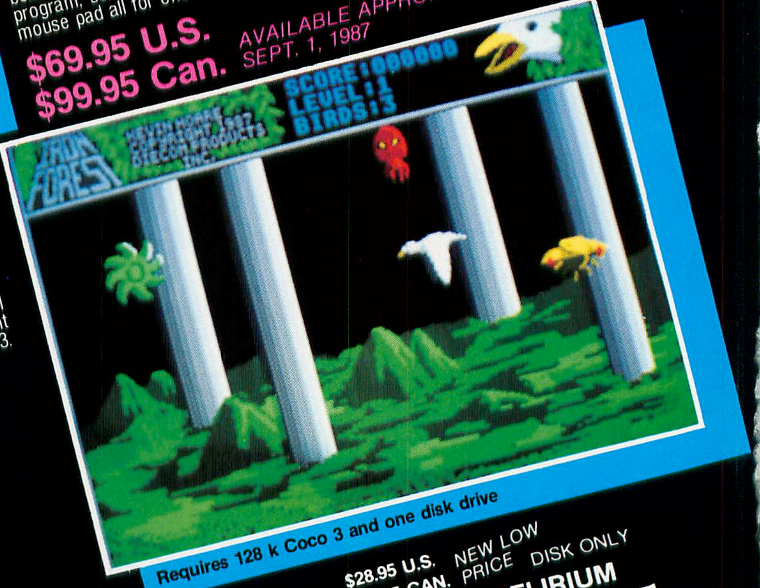

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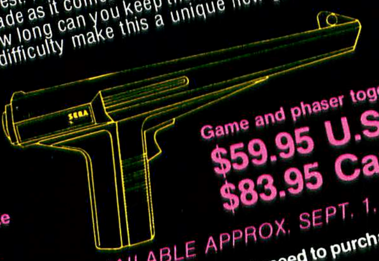

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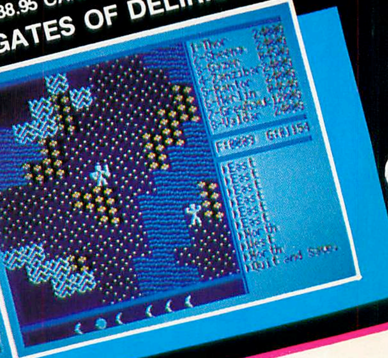

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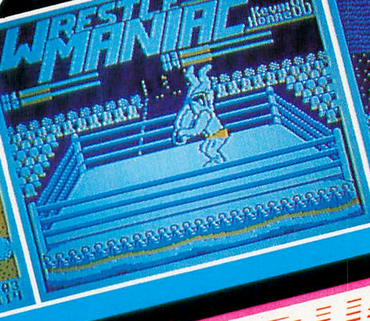

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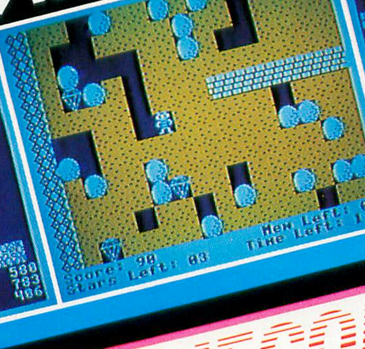

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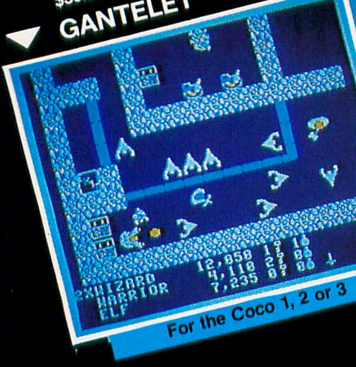

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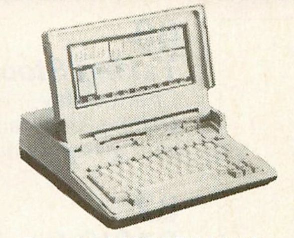

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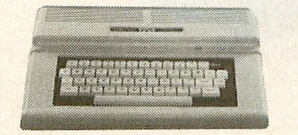

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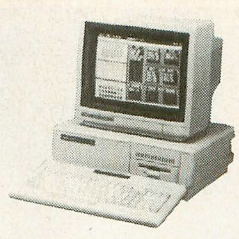

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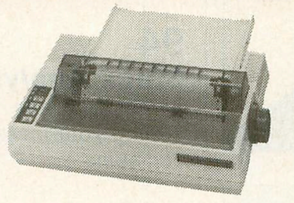

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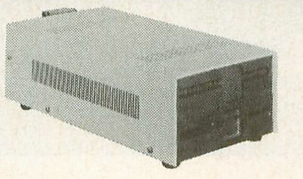

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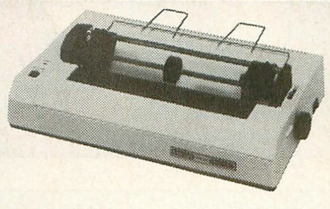

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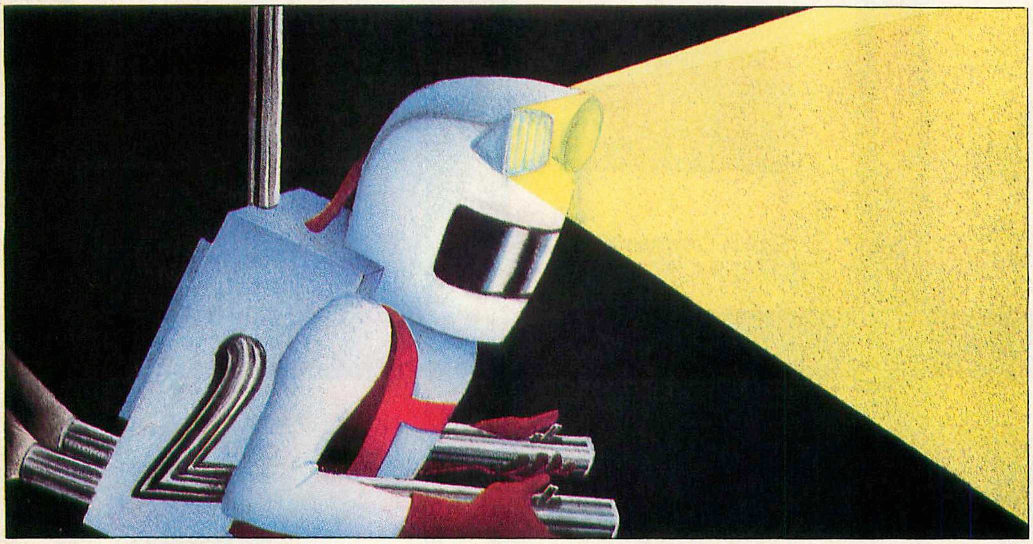

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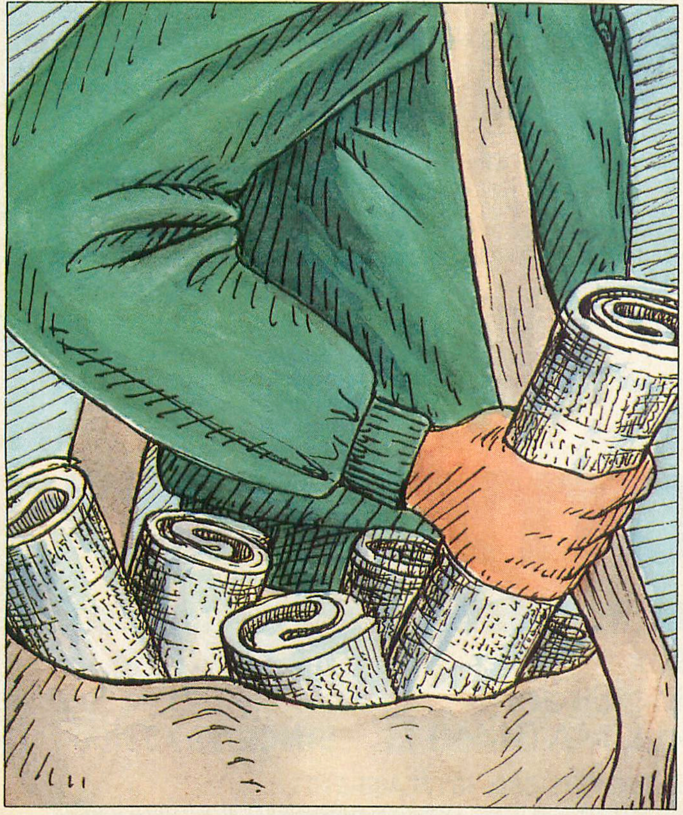

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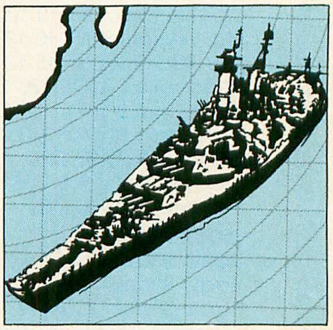

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Letters to the RAINBOW

A Thief by Any Other Name . . .

Editor:

This is in reference to the growing awareness in the computer community of the illegality of software theft/piracy. I'm a SysOp of a CoCo 20Mb BBS, The Crusader. I've been online 1½ years now. I am not a "pirate," nor do I condone piracy. On my BBS for over eight months now we have been waging open attack on the subject of piracy, more honestly called theft.

Now, there have been a lot of good comments lately in THE RAINBOW on this subject. I myself have been trying to get any SysOp or user I talk with to turn in known pirates and pirate BBSs they know of or run into. I firmly believe that if the SysOps were to blacklist and ban from their BBSs known pirates, if they refused to allow magazine or other pirated programs on their BBSs, if they refused to allow access to a user who will not leave honest log information (what has an honest person to hide?), and if they personally verified any user of their systems, piracy would stop fast.

What never ceases to amaze me is the number of otherwise honest people who would condemn shoplifting and other kinds of theft and yet defend or at least condone piracy. The worst are the SysOps — either from the mistaken idea that users will not call unless they have pirated programs for downloading or from trying to be one of the "don't rock the boat" crowd. Worse, some SysOps do not even have the guts to call it theft and look the other way — like the ostrich, they feel that if they don't see it, it won't touch them, and so they allow open trading (piracy) messages on their BBSs or allow magazine programs to be uploaded.

Come on, this may sound harsh, but look at the facts. When a SysOp allows, or worse, *encourages* piracy and does not stop it dead when he sees it, he is helping it spread even when he himself is not doing it.

This is a subject that badly needs addressing. When a new user comes into the BBS world, he sees magazine programs, etc. Well, of course he gets the idea it is common and OK (he might even feel it's wrong but he's new, so says nothing). He in turn passes on what he gets, and if someone tells him it is not OK, well, it was on such and such's BBS, so mind your own business. And the crime goes on.

I also hear the excuse that software costs too much. OK, fair enough. But would *you* steal a car or TV that cost more than you thought it was worth? I doubt it. You would either save up for it or buy a different model or brand. Real simple. So much for that excuse. Then there is the "Well, I'm only 13, and I don't have enough cash" excuse. Hmmm, that is more legitimate, at least, but jobs are there if you are willing to work and look for them.

Others use the excuse that software companies should protect their software better. Are you willing to pay extra for it? How about, "The software companies should sue if they really don't want us to steal."

Now, what are kids new to BBSing learning from all this? 1) Theft is condoned and OK if you do not get caught. 2) The computer community is a good place to learn to steal. 3) SysOps are thieves, so piracy is OK.

I frankly have received more heat from these otherwise honest SysOps than from all the pirates I've openly been condemning.

When the piracy scene is looked at fairly simply with all the excuses aside, we have theft plain and simple (yet people still claim it's not a crime). I spent five years in jail, and guess what? Not one guy I ever met there was guilty of a crime — he was a victim of *society*! Sound familiar?

There was a letter in RAINBOW a while back by an ex-pirate saying how sorry he was. Well, if he's really sorry he should send to the companies he stole from the money for their stolen wares plus the names of the people he gave copies to if they do not agree to do the same.

How hard is it to stop piracy? Not very. We just need *honest* SysOps who demand *honest* users. My BBS is temporarily off line, but the number is (213) 661-3568.

Jackie W. Farmer
Hollywood, CA

Back Talk

Editor:

In reference to "Accessing the Back Side" in January 1988's "CoCo Consultations" (Page 149), I would like to point out that all versions of my program, *KDSK*, can access the back side of the disk. *KDSK* uses a unique drive numbering scheme due to the many possible ROMs and patches available. Just add 4 to the physical drive number: Drive 4 is the back side of Drive 0; Drive 5 is the back side of Drive 1; and Drive 6 is the back side of Drive 2.

I also provide patches to registered owners of *KDSK* for unusual system configurations whenever possible. Finally, *KDSK* avoids ROM calls to ensure compatibility when new ROMs are released. I would not recommend disassembling *KDSK* since I've embedded numerous encryption routines throughout to discourage undocumented user modification.

Ken Wuelzer
113 Arrowhead Drive
Montgomery, AL 36117

Dragons Not Extinct in UK

Editor:

Although the Dragon 32/64 is no longer being manufactured in the UK (or in Spain), there are many very active Dragon owners. These enthusiasts rely on the *Dragon User* and RAINBOW magazines for support.

Now that Tandy in the UK is phasing out CoCos 1 and 2 and are not importing the CoCo 3, that software source will no longer be available shortly. However, there is still a small band of commercial software producers for the Dragon, in addition to enthusiastic amateur programmers.

Apart from local user groups up and down the country, there are the National Dragon Users Group and an OS-9 User Group (European), which are both very active.

Because of the reduction in software sources, I was very interested in the desktop publishing program written by H. Allen Curtis and listed in the October '87 issue of RAINBOW ("Desktop Publisher on a Shoestring," Page 58).

I tapped in the program, changed the file handling routine to the Dragon system, and quickly produced a Christmas greetings card for the office. The only other change made was to the I/O memory area to make it compatible with my "dump" program. For any other Dragon owners interested, here are the changed lines for the program:

Desktop Low

```
15 GOSUB440:CLS:PRINT@193,
"FILENAME: ";:LINEINPUT" TELL
ME!";SAVE F$+".LR",&HC00,
&H2400,&HA0EA:RETURN
20 GOSUB440:CLS:PRINT@193,
"FILENAME: ";:LINEINPUT
"WHICH ?";F$:LOADF$+".LR":
RETURN
```

Genfont1

```
900 CREATE "FONT1"
1000 F$="FONT1"
1010 FOR I= 1 TO 84
1020 FWRITE F$;F$(I):NEXT
1030 FOR I=1 TO 84
1040 FWRITE F$;M(I):NEXT
1050 FWRITE F$;D:FWRITE F$;S:
CLOSE
```

Genfont2

```
990 CREATE "FONT2"
1000 F$="FONT2"
1010 FOR I= 1 TO 84
1020 FWRITE F$;F$(I):NEXT
1030 FOR I=1 TO 84
1040 FWRITE F$;M(I):NEXT
1050 FWRITE F$;D:FWRITE F$;S:
CLOSE
```

Geoffrey H. Smith
Cheshire, England

INFO PLEASE

Editor:

I am looking for information about a company called BMC International, which was based in California and sold computer

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Richardson, Texas 75080
214/699-7273

printers. I am in need of a printer head for the model #BX-80 printer. I have called several companies with no success. BMC must have been bought out by another company. I will welcome any information!

Gary Anderson
1010 Tullar Road, Apt. B
Neenah, WI 54956

Don't Give this Teacher an Apple!

Editor:

Although RAINBOW is intended for CoCos, many subscribers probably have other equipment, too. One piece of hardware I am trying to hook up is a PC Viewer, a large LCD display that fits over an overhead projector. Whatever is displayed on the computer screen is what is displayed on the overhead. It is a great idea, if you have a PC. What I have is an older Apple IIe, sending out a composite signal.

Since the Zenith monitor worked with both the Apple and the CoCo hooked up to a Universal Plus monitor, I thought I could just connect the CoCo to the composite interface on the PC Viewer. It almost worked. Block graphics came out OK, high resolution was a blank and text looked like it skipped every other line.

The information that comes with the PC Viewer is scanty, but it does list several computers that use an RGB interface. Since the Universal Video Interface supports RGB (doesn't it, for CoCo 2?), why shouldn't this work? If, after looking at the signal hookups, there is absolutely no hope of hooking up the CoCo 2, what about the CoCo 3? Would it be possible to run the CoCo 2 software on the CoCo 3, and interface it with the PC Viewer?

My reason for all this foolishness has to do with the technology and my desire to use the CoCo in the classroom. One computer does not go too far with 30 students, but using the printer as our output device, we have been able to work with some interesting simulations. Having direct access to the computer via the PC Viewer would be great. I prefer to write programs for the CoCo rather than use Apple BASIC. If there is any possible way to hook up this new device, I want to give it my best shot. The alternative is to become proficient in Apple BASIC and translate programs. Please save me from this fate. I am a desperate man.

Also, I am interested in hearing from other teachers who use CoCos in the classroom.

Michael Franich
Lakeridge Jr. High
5909 Myers Rd. E.
Sumner, WA 98390

Derby City RAINBOWfest?

Editor:

It occurred to me (and hopefully will also to the people at THE RAINBOW) that it would be interesting to have a RAINBOWfest in Louisville. This would allow CoCo enthusiasts to venture out to Prospect to see where THE RAINBOW is published. I feel this would be very exciting. In addition, this choice of location would allow a different group to attend a RAINBOWfest that previously has not had the chance because of geographical limitations. Possibly the event would not be as large as some others, but please give it a chance.

Also, I am very interested in finding more information about a special hardware project. I would like to obtain an IBM-type computer case for the purpose of installation of my disk drives, modem, and the insides of my CoCo with a separate keyboard. If anyone can help or pass on information, I would be extremely grateful. Any technical information would be of help.

Thank you for such a fine magazine.

William Bartley
Box 26 Haggin Hall UK
Lexington, KY 40526

Would you travel to Louisville to attend a RAINBOWfest? If so, let us hear from you.

The Original Touch

Editor:

I am looking for software to use with Theodore P. Hasenstaub's light pen hardware project in April 1983's RAINBOW, Page 90, for creating original graphics from a television image. I have a CoCo 3 and the Radio Shack TV/Monitor. A digitizer is fine, but I much prefer the original touch.

D'Arcy Brownrigg
P.O. Box 292
Chelsea, Quebec
Canada J0X 1N0

PEN PALS

• I am looking for pen pals seriously interested in OS-9 programming (assembler, C, BASIC09). I have a CoCo 3 with two disk drives, a mouse and a monochrome monitor. No beginners, please.

Alain Smedts
Joseph Wuytslaan 37
8700 Deur NE
Belgium

• I am a 13-year-old boy and I'm looking for a pen pal, preferably a girl from 12 to 15 years old. I have a CoCo 3 with a free access, 24-hour bulletin board on it. Some of my interests outside of the computer realm include band, comic books, etc.

Daven Howard
R.R. #2 Box 23B
Gays Mills, WI 54631

• I am 15 years old, have a CoCo 2 and 3, DMP-105 printer, three disk drives, a CCR-81 cassette and a modem. I would like to have pen pals from anywhere in the world.

Luis Martinez
LUMA
2 C-10 Royal Town
Bayamon, PR 00619

• A CoCo user over 50 years old would like to communicate with other users who share an interest in game playing. I have a CoCo 2, cassette recorder and a DMP-130 printer. I enjoy Adventure games but need help solving most of them.

Carla E. Sheridan
P.O. Box 501
Rodman, NY 13682

• I would like to have pen pals from anywhere in the USA, Canada, Australia, New Zealand, Europe or Africa. I own a CoCo 3, 128K with a DMP-110 printer, disk drive, Multi-Pak Interface, direct connect modem pak, and a speech cartridge. I'm 38 years old.

James W. Andrews
1732 Orange Lane
Kissimmee, FL 32741

• I am 16 years old. I have a CoCo 2, two double-sided, double-density drives, a Multi-Pak, a 1200 baud modem, a DMP-105, a cassette player, a light controller and a plotter. I am looking for anyone who would like to help me in my quest for knowledge of the CoCo. Or anyone who just likes to talk. I'll answer as many letters as humanly possible.

Erik Bixby
3441 E. Dahlia Drive
Phoenix, AZ 85028

• I am 15 years old and looking for pen pals all over the world, especially in the USA, Canada and Australia. I have a 64K CoCo, CCR-81 cassette recorder and a new Tandy FD-501 disk drive (including Drive 1).

Daniel Alvarez
Sucre 2220 4 'B'
C.P. 1428 Capital Federal
Republica Argentina

• I'm looking for pen pals from all over the world. I have a 64K CoCo 1 with a cassette player and I like to play games and Adventures.

Tal Pery
Havakefet Str. 3
Kiron 55408
Israel

• I have a 64K CoCo and a cassette recorder, and I would like a pen pal from anywhere, especially in South America.

Michael A. Lees
Rua das Valsas, 167
Jacarepagua
Rio de Janeiro — RJ
CEP — 22743 — Brazil

• I am a collector of public domain CoCo 2 and 3 pictures and would like to obtain pen pals who have good public domain pictures they would like to share. I am particularly interested in CoCo 3 pictures.

Chris Steeves
P.O. Box 255
Petitcodiac, New Brunswick
Canada E0A 2H0

BULLETIN BOARD SYSTEMS

• Come on and enter the Dungeon BBS, 300/1200 baud. Offers a great online games area, SIGs, forums, downloads, and news and information. Currently operating on a four-drive system, soon to upgrade to 10Mb. Hours: 6 p.m. to 6 a.m. Monday through Friday, 24 hours Saturdays and Sundays. Call (919) 726-9737.

Chuck Katsekes, SysOp
410 Scott Drive
Newport, NC 28570

• I would like to announce the opening of my BBS, The Tomb. It is up 24 hours a day, 300/1200 baud, 8/N/1. It is run on a 512K CoCo 3 with four drives. Call (515) 432-7853.

Steve Kratz
217 West 2nd Street
Boone, IA 50036

• I am happy to announce the arrival of a new BBS, The Mindmaster's Domain of Chicago, running on a *Colorama* system. It is operating at 300/1200 baud, 7 bits, even parity, 24 hours, seven days a week. Call (312) 463-8932. The SysOp is Mindmaster.

David Lucas
4451 N. Christiana
Chicago, IL 60625

• I am the secretary and treasurer of the Enid Chapter of CoCo Inc., The Central Oklahoma Computer Organization. We are presently expanding our support network for CoCo users. We have a new newsletter, are building SIGs, and have added a BBS (405-237-9282). I would like to hear from anyone interested in starting a McAlester, OK, chapter. We also support a budding Public Domain library and P/D swap disk.

David Graham
724 E. Maple
Enid, OK 73701

• I would like to announce a new CoCo 3 BBS in Montreal, serving most of the city. It has nice online games and a few boards. Give it a call at (514) 351-2130. Open 24 hours a day, seven days a week.

Jean Beland
7720 Pierre-de-Coubertin (est)
Montreal, P.Q.
Canada H1L 2B2

• I would like to announce Tri City BBS, sponsored by the Citrus Color Computer Club in San Bernardino, California. It runs *PBBS* 5.0 on a CoCo 3, and is online 24 hours, seven days a week, 7-E-1. Many topic areas, all callers welcome. Please fill out application on first call to be validated. First callers have limited access. Call (714) 885-3789.

James C. Gracey
101541
2686 W. Mill St.
San Bernardino, CA 92410

• Call Dial-Your-Match #399, a computerized dating and meeting BBS system. All persons over 18 are welcome. Call (201) 261-1977 or (201) 265-2481. This is a free service. CoCo SIG online.

David Fischer
P.O. Box 423/898-A Blvd.
New Milford, NJ 07646

• Color Galaxy BBS in Santa Ana, California, is now online 24 hours, 300/1200 baud, 7-O-1, featuring Xmodem uploads and downloads, games, utilities, graphics, music, 10 message bases and the ability to send private uploads to an individual user! Call (714) 839-5830 for free access.

Dave Cragun
901 S. Toland St.
Santa Ana, CA 92704

• The CoCo' Nuts BBS now operates at 300/1200 baud, 24 hours a day. Call (919) 425-8242 for BBS; (919) 425-7751 for voice. The BBS operates at 7 bits, even parity, 1 stop bit. We welcome all users to come and visit us anytime. I am presently with the Army, stationed in Honduras, California. But the BBS is still in operation at the North Carolina address.

Tommie Taylor
6310 Belle Terre
Fayetteville, NC 28304

THE RAINBOW welcomes letters to the editor. Mail should be addressed to: Letters to Rainbow, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. Letters should include the writer's full name and address. Letters may be edited for purposes of clarity or to conserve space.

Letters to the editor may also be sent to us through our Delphi CoCo SIG. From the CoCo SIG> prompt, type `RAI` to take you into the Rainbow Magazine Services area of the SIG. At the RAINBOW> prompt, type `LET` to reach the LETTERS> prompt and then select Letters for Publication. Be sure to include your complete name and address.

The Best Has Arrived

Word Power 3

(The Ultimate Word Processor for the CoCo 3)

Are you still using your CoCo 2 word processor on the CoCo 3 with patchwork? You don't have to any more. With Word Power 3, Microcom answers the challenge of word processors for the CoCo 3. It bridges the gap between "what is" and "what should be" in word processors. **No other word processor offers such a wide array of features that are so easy to learn and use.** Check out the impressive features:

DISPLAY

The 80-column display with true lowercase lets you view the full width of a standard page. **All the prompts are displayed in plain English in neat colored windows.** The current column number, line number, page number and the percentage of memory remaining is displayed on the screen at all times. The program even displays the bottom margin perforation so you know where one page ends and the other begins. You can also change the foreground/background color of the screen to suit your needs!

AVAILABLE MEMORY

Unlike most other word processors, Word Power 3 gives you 80K of memory with a 128K CoCo 3 and more than 460K with a 512K CoCo 3 to store text.

TYPING/EDITING

Word Power 3 has one of the most powerful and user-friendly full-screen editors with wordwrap. All you do is type; Word Power 3 takes care of the text arrangement. It even has a built-in **Auto-Save** feature which saves the current text to disk at regular intervals; so you know that your latest version is saved on disk. Here are some of the editing features of Word Power 3:

Auto-repeat; Key-Click; Cursor up, down, left, right, beginning of line, end of line, next word, previous word, top of text, end of text; page forward, backward; 4-way scrolling; block copy, move, delete; global search and replace (with wild-card search); line positioning (left, right or center); insert/overstrike modes; delete to beginning/end of line, next/previous word; and tabs. You can also embed printer codes in text to take advantage of underlining, sub/superscript and other printer functions. Define left, right, top and bottom margins, and page length.

MAIL MERGE

Ever try mailing out the same letter to 500 different persons? Could be quite a chore. Not with the Mail Merge feature of Word Power 3. Using this feature, you can type a letter, follow it through with a list of addresses and have Word Power 3 print out personalized letters. It's that easy!

LOADING/SAVING FILES TO DISK

Word Power 3 creates ASCII format files which are compatible with almost all terminal, spell-checking, and other word-processing programs. It allows you to load, save and kill files and also to create and edit Basic, Pascal, C and Assembly files. Supports double-sided drives and various drive step rates.

PRINTING

Word Power 3 drives almost any printer (DMP series, EPSON, GEMINI, OKIDATA, etc.). Allows print options such as different baud rates, line spacing, page pause, partial print, multi-line headers/footers, page numbers, page number placement, and right justification. You can also change the values for these print options within the text by using embedded printer option codes.

INSTRUCTION MANUAL

Word Power 3 comes with a well-written and easy-to-comprehend instruction manual that makes writing with Word Power 3 a breeze.

Word Power 3 comes on disk for only **$69.95.**

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RAINBOW Info

How To Read Rainbow

Please note that all the BASIC program listings in THE RAINBOW are formatted for a 32-character screen — so they show up just as they do on your CoCo screen. One easy way to check on the accuracy of your typing is to compare what character "goes under" what. If the characters match — and your line endings come out the same — you have a pretty good way of knowing that your typing is accurate.

We also have "key boxes" to show you the *minimum* system a program needs. But, *do* read the text before you start typing.

Finally, the little disk and/or cassette symbols on the table of contents and at the beginning of articles indicate that the program is available through our RAINBOW ON DISK or RAINBOW ON TAPE service. An order form for these services is on the insert card bound in the magazine.

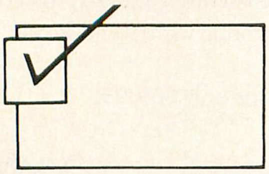
What's A CoCo?

CoCo is an affectionate name that was first given to the Tandy Color Computer by its many fans, users and owners.

However, when we use the term CoCo, we refer to both the Tandy Color Computer and the TDP System-100 Computer. (While many TDP-100s are still in service, the TDP Electronics division of Tandy no longer markets the CoCo look-alike.) It is easier than using both of the "given" names throughout THE RAINBOW.

In most cases, when a specific computer is mentioned, the application is for that specific computer. However, since the TDP System-100 and Tandy Color are, for all purposes, the same computer in a different case, these terms are almost always interchangeable.

Rainbow Check Plus



The small box accompanying a program listing in THE RAINBOW is a "check sum" system, which is designed to help you type in programs accurately.

Rainbow Check PLUS counts the number and values of characters you type in. You can then compare the number you get to those printed in THE RAINBOW. On longer programs, some benchmark lines are given. When you reach the end of one of those lines with your typing, simply check to see if the numbers match.

To use *Rainbow Check PLUS*, type in the program and save it for later use, then type in the command RUN and press ENTER. Once the program has run, type NEW and press ENTER to remove it from the area where the program you're typing in will go.

Now, while keying in a listing from THE RAINBOW, whenever you press the down arrow key, your CoCo gives the check sum based on the length and content of the program in memory. This is to check against the numbers printed in THE RAINBOW. If your number is different, check the listing carefully to be sure you typed in the correct BASIC program code. For more details on this helpful utility, refer to H. Allen Curtis' article on Page 21 of the February 1984 RAINBOW.

Since *Rainbow Check PLUS* counts spaces and punctuation, be sure to type in the listing exactly the way it's given in the magazine.

```
10 CLS:X=256*PEEK(35)+178
20 CLEAR 25,X-1
30 X=256*PEEK (35)+178
40 FOR Z=X TO X+77
50 READ Y:W=W+Y:PRINT Z,Y;W
60 POKE Z,Y:NEXT
70 IFW=7985THEN80ELSEPRINT
   "DATA ERROR":STOP
80 EXEC X:END
90 DATA 182, 1, 106, 167, 140, 60, 134
100 DATA 126, 183, 1, 106, 190, 1, 107
110 DATA 175, 140, 50, 48, 140, 4, 191
120 DATA 1, 107, 57, 129, 10, 38, 38
130 DATA 52, 22, 79, 158, 25, 230, 129
140 DATA 39, 12, 171, 128, 171, 128
150 DATA 230, 132, 38, 250, 48, 1, 32
160 DATA 240, 183, 2, 222, 48, 140, 14
170 DATA 159, 166, 166, 132, 28, 254
180 DATA 189, 173, 198, 53, 22, 126, 0
190 DATA 0, 135, 255, 134, 40, 55
200 DATA 51, 52, 41, 0
```

OS-9 and RAINBOW ON DISK

The OS-9 side of RAINBOW ON DISK contains two directories: CMDS and SOURCE. It also contains a file, `read.me.first`, which explains the division of the two directories. The CMDS directory contains executable programs and the SOURCE directory contains the ASCII source code for these programs. BASIC09 programs will only be offered in source form so they will only be found in the SOURCE directory.

OS-9 is a very powerful operating system. Because of this, it is not easy to learn at first. However, while we can give specific instructions for using the OS-9 programs, you will find that the OS-9 programs will be of little use unless you are familiar with the operating system. For this reason, if you haven't "learned" OS-9 or are not comfortable with it, we suggest you read *The Complete Rainbow Guide to OS-9* by Dale Puckett and Peter Dibble.

The following is not intended as a course in OS-9. It merely states how to get the OS-9 programs from RAINBOW ON DISK to your OS-9 system disk. Use the procedures appropriate for your system. Before doing so, however, boot the OS-9 operating system according to the documentation from Radio Shack.

1) Type `load dir list copy` and press ENTER.
2) If you have only one disk drive, remove the OS-9 system disk from Drive 0 and replace it with the OS-9 side of RAINBOW ON DISK. Then type `chd/d0` and press ENTER. If you have two disk drives, leave the sytem master in Drive 0 and put the RAINBOW ON DISK in Drive 1. Then type `chd/d1` and press ENTER.
3) List the `read.me.first` file to the screen by typing `list read.me.first` and pressing ENTER.
4) Entering `dir` will give you a directory of the OS-9 side of RAINBOW ON DISK. To see what programs are in the CMDS directory, enter `dir cmds`. Follow a similar method to see what source files are in the SOURCE directory.
5) When you find a program you want to use, copy it to the CMDS directory on your system disk with one of the following commands:

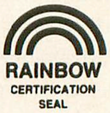
One-drive system: `copy /d0/cmds/`*filename* `/d0/cmds/`*filename* `-s`

The system will prompt you to alternately place the source disk (RAINBOW ON DISK) or the destination disk (system disk) in Drive 0.

Two-drive system: `copy /d1/cmds/`*filename* `/d0/cmds/`*filename*

Once you have copied the program, you execute it from your system master by placing that disk in Drive 0 and entering the name of the file.

The Rainbow Seal



The Rainbow Certification Seal is our way of helping you, the consumer. The purpose of the Seal is to certify to you that any product that carries the Seal has actually been seen by us, that it does, indeed, exist and that we have a sample copy here at THE RAINBOW.

Manufacturers of products — hardware, software and firmware — are encouraged by us to submit their products to THE RAINBOW for certification. We ascertain that their products are, in actuality, what they purport to be and, upon such determination, award a Seal.

The Seal, however, is not a "guarantee of satisfaction." The certification process is different from the review process. You are encouraged to read our reviews to determine whether the product is right for your needs.

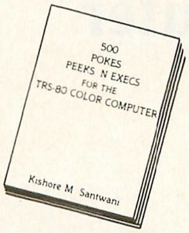
There is absolutely no relationship between advertising in THE RAINBOW and the certification process. Certification is open and available to any product pertaining to CoCo. A Seal will be awarded to any commercial product, regardless of whether the firm advertises or not.

We will appreciate knowing of instances of violation of Seal use.

BOOKS & GRAPHICS

500 POKEs, PEEKs, 'N EXECs

FOR THE TRS-80 COCO



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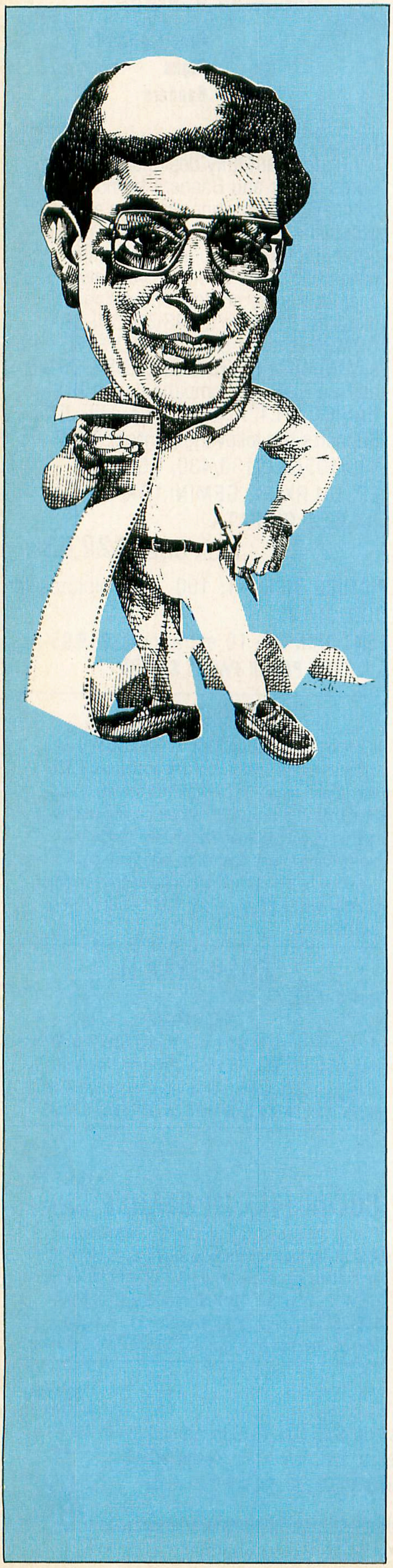

Yes, Alan, There Is a Future for the Color Computer

Dear Mr. Falk:

I have been a loyal CoCo user since 1982 and a RAINBOW reader just as long. We (CoCo Community) have looked to THE RAINBOW for honest, unbiased answers to our questions. You have not let us down!

Please answer this letter without regard to the fact that Tandy is a major contributor to THE RAINBOW and that members of your staff are directly associated with Tandy.

How much time does the CoCo have? In particular, the CoCo 3. There have been drastic price reductions on the CoCo 3 and rumors float heavy among members of my user group and others in the surrounding area that Tandy thinks the CoCo 3 was a mistake, and will suffer the same fate as the Model I, III, 4 and even the almighty 2000, not to mention the Tandy savior 1000EX and SX.

Don't get me wrong, I love my CoCo and still have the old gray horse. I wouldn't trade either of them for a trainload of 1000s. I have megabucks invested in my CoCo 3, monitor, 512K, two drives, Multi-Pak, etc., etc., the list is awesome. Help!

Alan L. Parker
Kokomo, IN

Thanks for writing, Alan, because I think it is time to dispel a few rumors myself. Your letter gives me a chance to do so.

Let me put it to you this way: If you had a product that outsold every other product in its classification every year — year in and year out — would you discontinue that product? The answer, of course, is that you would not. And that is just what is happening with the Color Computer.

Yes, I am pleased to be able to report that, in terms of numbers of units sold, for the umpteenth year in a row, the CoCo has outsold every other type of Tandy computer during the season just past.

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(All utilities support 40/80 columns for CoCo 3)
(CoCo 2 versions are available for most utilities)

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(Latest Version): Transfer CoCo Disk files to IBM compatible computer. Transfer MS-DOS files to CoCo. **$39.95**

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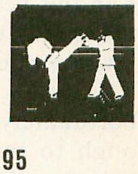

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That means more CoCos than 1000s. More Color Computers than 3000s. More than *anything* else. Period.

Would *you* discontinue a computer that sold so well? I wouldn't. And Tandy wouldn't, either.

Since we're talking about the holiday season sales in particular, I am tempted to paraphrase that famous column from the editor of the Baltimore *Sun* to a little girl named Virginia who wrote in to say that all her friends were telling her there was no Santa Claus. The editor wrote back on Page One to say, "Your little friends are wrong, Virginia."

Let me say, Alan, that your friends — be they little or big — are wrong, too.

Later in the same reply, the editor wrote that Santa "lives and lives forever." We all know it won't quite happen this way, Alan, but the truth is that the CoCo seems to be living forever, too.

One of the reasons this is so, Alan and friends everywhere, is simply because of the very thing about which you are concerned — the special prices established at holiday time.

Two excellent marketing people, Bernie Apell — president of Radio Shack — and Barry Thompson — CoCo's product manager — are the ones behind that pricing. Price reductions are possible for a number of reasons. Among them:

- Economies in production, which are, of course, going on throughout the year, are usually most felt with the holiday manufacturing cycle.
- The largest single "buy" of Color Computers is for the holiday period. Everyone understands quantity discounts.
- In this year's case, the decision to manufacture the CoCo 3 in Korea was particularly good for Tandy.

Fortunately, the company is large enough to make on-shore/off-shore decisions and take advantage of them. (Incidentally, CoCos will be manufactured in the United States during 1988, another example of this versatility. In this case, Tandy will be taking advantage of the international currency situation.)

A nice thing about Tandy's pricing is that if they can make it cheaper, they will sell it cheaper. That means "passing the savings along." And, as they bring more and more people into the CoCo Community, we all benefit.

You are, however, wrong about two things, Alan. First of all, Tandy is not a "major contributor" to THE RAINBOW. Their main contribution is for advertising space — and they pay the same rates as other people. They buy fewer pages than a number of other advertisers, as well. Other than that, there is no "contribution" by Tandy to THE RAINBOW. We're an independent company and an independent magazine. We do, of course, like Tandy products. If we didn't, we'd be foolish to publish magazines in support of them.

> ***"For the umpteenth year in a row, the CoCo has outsold every other type of Tandy Computer."***

Also, Alan, there is no member of my staff who is "directly associated with Tandy." None. Zero. Zilch. As I said above, we're an independent company and an independent publication.

Of course, we have good friends at Tandy. People in marketing information and computer merchandising. People on the "executive floors" and people in the manufacturing plants. When we're searching for information, we try to find out as much as we can.

And, based on that sort of inquiry, I can find no information whatsoever that Tandy plans to discontinue production or sale of the Color Computer now or in the foreseeable future. For one thing, it is their best-seller. For another, they are building a new manufacturing plant in Texas just for CoCo.

Rumors like this, Alan, crop up here and there every year. They have, obviously, never been true and they are not true now.

For instance, if the CoCo were to be dropped, why would Tandy be signing contracts for new software from several major software houses? Why would Tandy have developed *Multi-Vue*? Why would Tandy invest in a new version of OS-9 for CoCo 3? Why would Tandy have contracted with us for still another OS-9 book?

Tandy is more active in the Color Computer software field than ever before. All the signs point to more activity, not less. And if so, they certainly want to increase, as much as they can, the number of people who would be interested in buying these products. So they keep on manufacturing and selling Color Computers.

Seems logical to me.

* * *

As an aside, the third-party market seems to be more and more interested in the CoCo every month. We've been getting more and more inquiries from people interested in new and exciting things for the CoCo.

Readers who have been with us for more than a little while will remember a column in which I compared the CoCo 3 with the original Color Computer in terms of where each machine was in its development. At the time, I saw the "3" as being far ahead in terms of people writing and developing applications.

I re-surveyed that observation just before Mr. Parker's letter arrived. The case is even more true now than it was. More people are starting to do more new things for the CoCo 3 than were doing anything for the original machine at the same time in its development stage.

You are already seeing some new names to go with some of the more familiar ones in the advertising space of THE RAINBOW. I encourage you to encourage these advertisers — old and new — by closely examining their offerings and supporting them (and, incidentally, the CoCo Community) by buying their products. Many of them are excellent.

And, yes, you will see some familiar names disappear from these pages. Our advertising department did a recent survey and found those firms with new products and new ideas were reporting sales increases. Those who were riding along with the same version of the same product and the same business approach they had in 1983 were not doing so well. Frankly, we have tried to counsel with a number of these old friends, but — for some — the message has never gotten through.

All of us here are very optimistic about the CoCo market. There is no reason whatsoever not to be.

— Lonnie Falk

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Multi-Pak PAL Chip for CoCo 3 (Specify Multipak Cat #): **$19.95**

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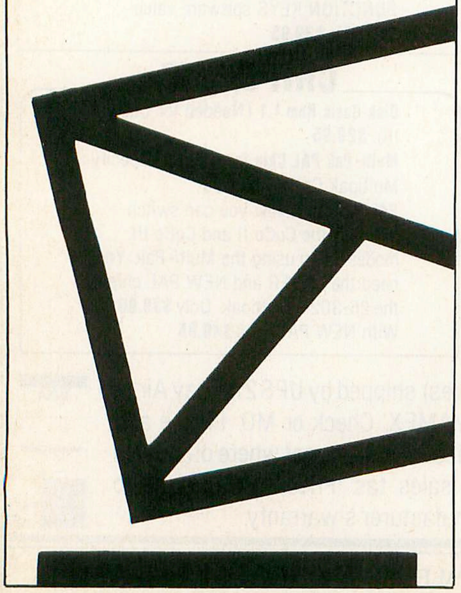

Building March's Rainbow

So it's time for our annual Business and Finance issue. Whenever we arrive at this time of year, some of us think back to our first Business and Finance issue and one of our rare "Now, wait a minute!" discussions with cover artist Fred Crawford. Our "problem" concerned his finished art for the March 1984 issue of THE RAINBOW.

If you've been with us for a while, think back to the cover with the distinguished guy in a vest, sitting in an easy chair in his den and looking over a printout. We had asked Fred to portray an obviously successful-looking man relaxing while he reviewed his stock portfolio performance. Fred had taken that concept and brought it to life, but with one major unanticipated twist: The computer sitting on the desk in the background was a Model III. When we first saw the finished art, we exclaimed, "That's *not* a CoCo!!" To which Fred replied, "Well, you said this was the *business* issue, so I figured you'd want a *business* computer." Do I have to tell you that a short sermon ensued? And the cover art *did*, quite literally, go back to the drawing board.

No, the CoCo cannot easily handle all business-related computer needs any more than a pickup truck can haul a big herd of cattle. But just as you can manage to transport a couple of steers in a stake pickup, or haul a few bales of hay, a cord of firewood, a load of sand, or a party of duck hunters, when it comes to computing, you can do just about everything you need with a CoCo and a little time. You may have to load and reload more often than with a bigger machine sporting integrated packages, but the CoCo is nothing if not versatile.

Singer Mickey Newbury does a number about a man whose wife one day grabs his pickup truck and runs away, taking with her the kids and his best hound dog. The last line of the song is: "I sure miss that truck." Well, a lot of us feel that strongly about our CoCo. We'd rather fight than switch. Well, now that we have the CoCo 3 with up to 512K and OS-9 Level II, our little machine can "get down to business," too. The fact is, our little "pickup truck" computer can handle some mighty big jobs. With OS-9, for instance, our CoCo can now have 40- or 80-track, double-sided drives, the new 3½-inch drive with 720K of storage space or even a hard disk if we want (RAINBOW Technical Editor Cray Augsburg has a 35Mb hard disk hooked up to his CoCo 3).

Along with storage, our CoCo can zip along, as well. Tandy's Ed Juge said recently that one of their software engineers ran some unofficial tests comparing CoCo 3 and IBM "throughput" (which refers to how fast the microprocessor actually handles its instructions, rather than being a strict measure of CPU speed). Of course, the IBM PC has a much faster clock speed than does the CoCo 3, but the operating system has a considerable influence on how quickly a job gets done. The results? The CoCo 3 with OS-9 ran about 35 percent faster than the standard IBM PC!

With as much as 512K available to us, more program data can be memory-resident, reducing disk access time and, thus, speeding up things even more. Increased memory also allows room for help files or even integrated packages, complete with pop-up windows. And, of course, OS-9 gives us the ability to run several applications on the same screen, at the same time, each in its own window. How many windows? Well, even though he says 14 is practically the upper limit, Tandy's Mark Siegel recalls once having almost 30 going simultaneously! Maybe we should have a contest!

The point of all this is that getting down to "serious business" doesn't mean you have to trade in that sporty little pickup of a CoCo for some stodgy, cattle-truck PC or PC clone. But if you are considering business applications, it does mean you may want to investigate the power and performance of OS-9 on the CoCo 3. Yes, the learning curve of OS-9 is a bit steep at the beginning, but once you've completed the setup, you're past the hardest part. After all, in any business, you do have to make an investment to earn the dividends.

In closing, I'll remind you that it makes good business sense to invest in a subscription to THE RAINBOW: You save 35 percent of the newsstand price.

— Jutta Kapfhammer

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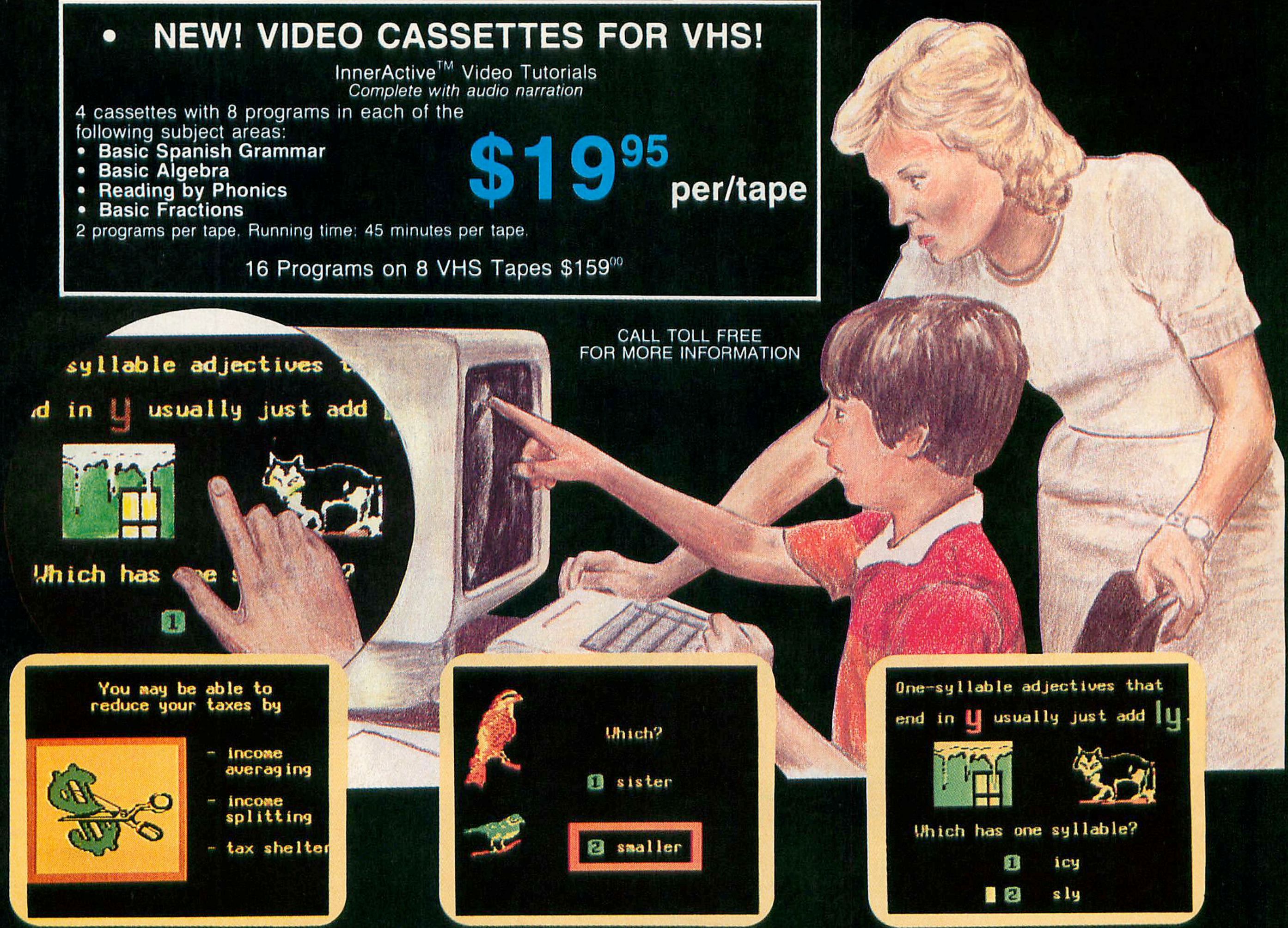

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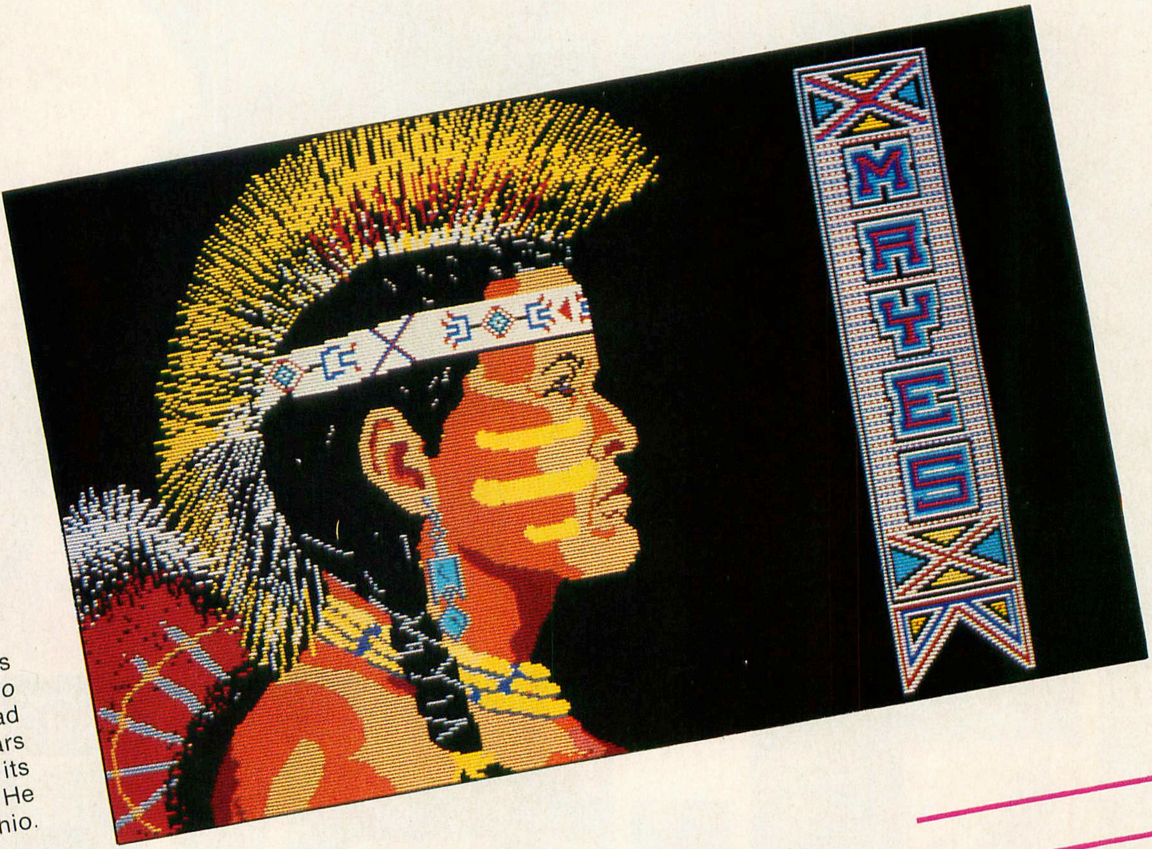
The CoCo Gallery

1st

COCO 3

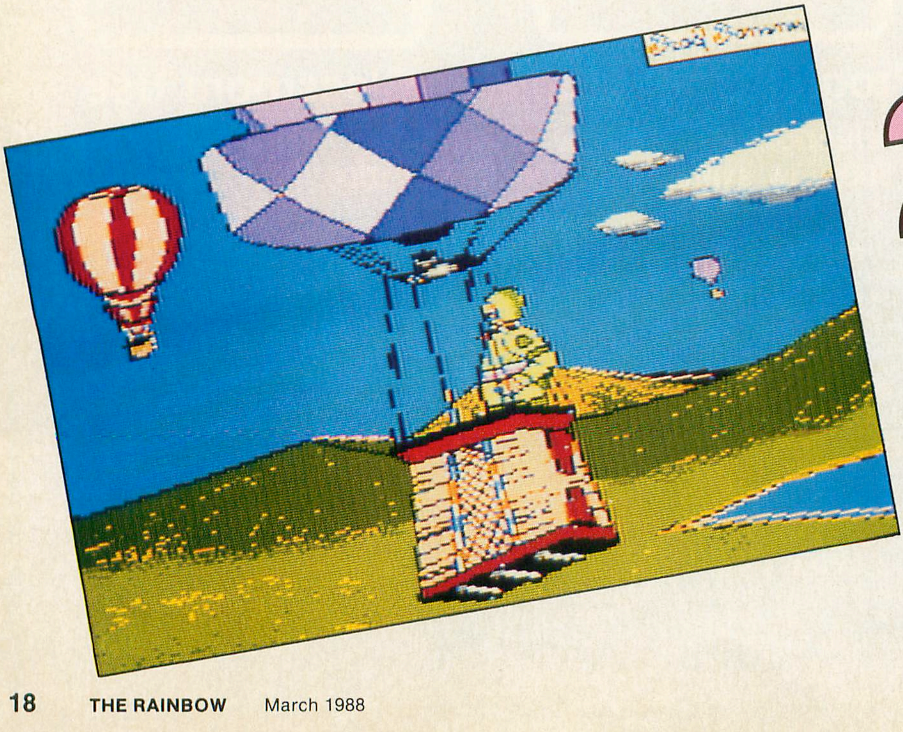


Indian

Wally Mayes

This intense graphic was generated with *CoCo Max III*. Wally has had his CoCo for two years and really enjoys its graphics capabilities. He lives in Hamilton, Ohio.

2nd



Ballooning

Brad Bansner

Color Max Deluxe was put to use to illustrate this hobby. Brad lives in Wyomissing, Pennsylvania, and is a sophomore in high school.

SHOWCASE YOUR BEST! You are invited to nominate original work for inclusion in upcoming showings of "CoCo Gallery." Share your creations with the CoCo Community! Be sure to send a cover letter with your name, address and phone number, detailing how you created your picture (what programs you used, etc.) and how to display it. Also, please include a few facts about yourself.

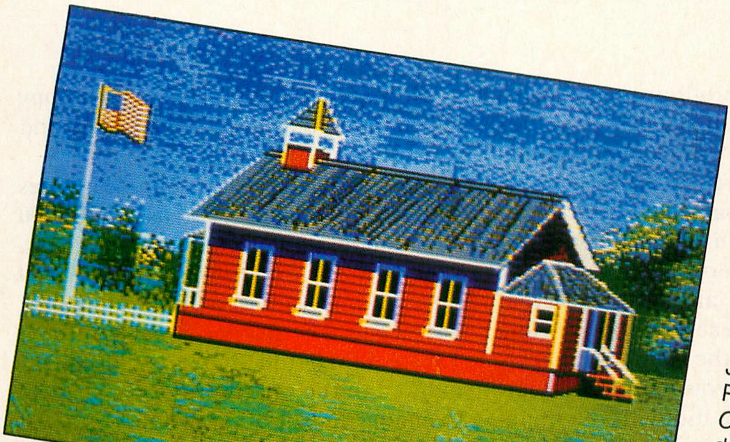
Don't send us anything owned by someone else; this means no game screens, digitized images from TV programs or material that's already been submitted elsewhere. A digitized copy of a picture that appears in a book or magazine is *not* an original work.

We will award two first prizes of $25, one for the CoCo 3 and one for the CoCo 1 and 2; one second prize of $15 and one third prize of $10. Honorable Mentions may also be given.

Please send your entry on either tape or disk to the CoCo Gallery, THE RAINBOW, P.O. Box 385, Prospect, KY 40059. Remember, this is a contest and your entry will not be returned.

— Angela Kapfhammer, Curator

We are taking "CoCo Gallery" to RAINBOWfest Chicago! See Page 35 for details.



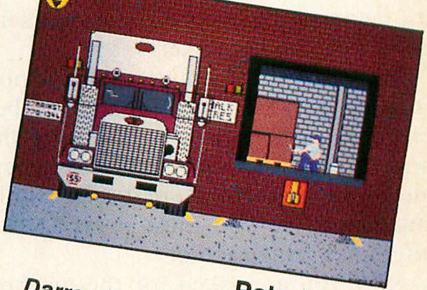
3rd

School

John Murvine, Jr.

John, of Ebensburg, Pennsylvania, used *Color Max 3* to develop this panorama of an educational institution.

HONORABLE MENTION



Peterbilt '86

Darren L. Nye and Michael Kofile

This frontal view of a 1986 Peterbilt tractor trailor was produced with *Color Max 3*. Darren and Michael live in Somerville, New Jersey.

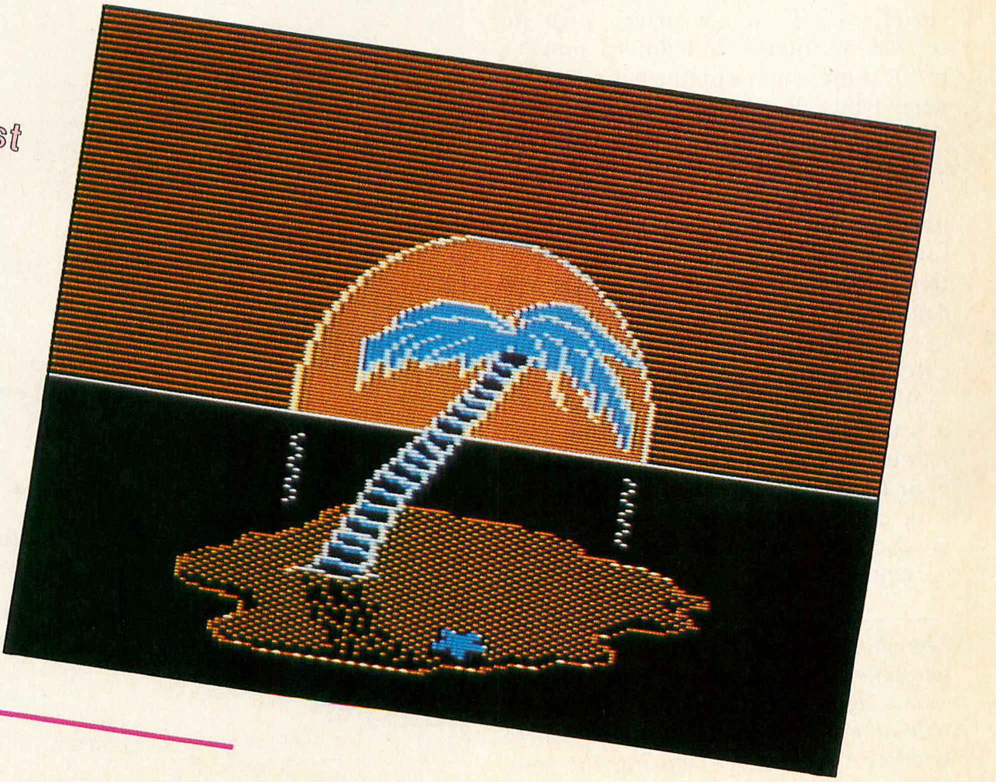
1st

COCO 1 & 2

Island

Christopher Lee Mayeux

Christopher, a self-employed electrician who enjoys programming in BASIC and BASIC09, produced this scene with *McPaint*. He lives in Chalmette, Louisiana.



A utility that prints invoices for parts and labor

Putting It on Their Tab

By Shawn Conant

Bill Generator is a handy program for anyone who needs to bill for labor plus materials. I use it constantly in my business as a self-employed cabinetmaker.

The program is simple to use. Upon running, you are asked for the number of hours to be billed, followed by the hourly wage. The prompts are generated by either `INPUT` or `LINE INPUT` statements, so you must press ENTER after answering each one.

Next you are asked for the markup for net prices and the discount for list prices. I always plan to make a small profit on the materials purchased for a job, but some supply companies bill me with a list price, then give a discount when the monthly bill is paid. Other suppliers give a net price, with no further discounts. If I am to make a profit, I must mark up the net prices for what I buy. But I don't want to make *too* much money, so I just take the discount from list prices as my profit.

It is always good to know just how much profit I have made on materials for any job, and this program keeps track of that for me. The markup and discount are entered as whole numbers for percentages, so `15` would be the entry for a markup of 15 percent.

When entering the cost of materials, it is necessary to indicate whether each amount is a net or list price by pressing N or L. When you have finished inputting materials, simply press ENTER instead of an amount, and you will be presented with your totals onscreen and asked if you want a bill printed. I often use the program up to this point for estimating jobs.

To print a bill, press Y and follow the prompts for the date and the client's address information. The Job Description category is a very simple text entry mode, sort of like an electronic typewriter. If you stop each line by pressing ENTER just before the graphics character on the screen, you will get a neat-looking bill. As you did with the materials list, press ENTER on an empty line when you're finished entering text. The final prompt is for any down payment received. If a printer is connected, two copies of the bill will print out, one for your client and another for your records. Added to the bottom of your copy will be the total cost of materials and your profit.

You will need to edit a couple of lines to customize it for your use. Line 390 should contain your name and address. Line 40 limits your job description to 10 lines; change that to a larger number if you want. The printer codes are for a Tandy DMP-130 and are clearly remarked in the program, making it easy to change to suit other printers. Line 50 sets the baud rate of the printer to 1200.

May your business always prosper.

(Questions or comments may be directed to the author at RFD Box 170, Guildhall, VT 05905. Please enclose an SASE when writing for a response.) ☐

```
                                John Doe
                                Main Street
                                Hometown, Vt. 05905
                                88/02/12

          John D. Customer
          1234 Purchase Avenue
          Lexington, KY, 40502

          Repair toner system on office copier

                        Labor=                $47.25

                        Materials=           $195.37

                        Total=               $242.62

                        Received=             $50.00

                        Balance due=         $192.62

                        Thank You!

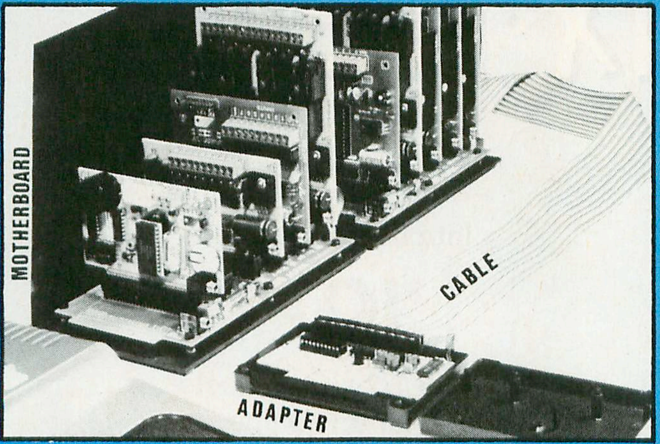

                        Materials cost=      $179.85

                        Profit                $15.52
```

Shawn Conant is a self-employed cabinetmaker living in the remote "Northeast Kingdom" of Vermont. He and his wife and five children use the CoCo to combat "cabin fever" during the long winters.

The Amazing A-BUS

NEW



**An A-BUS system with two Motherboards
A-BUS adapter in foreground**

**The A-BUS system works with the original CoCo,
the CoCo 2 and the CoCo 3.**

Plug into the future

With the A-BUS you can plug your PC (IBM, Apple, TRS-80) into a future of exciting new applications in the fields of control, monitoring, automation, sensing, robotics, etc.

Alpha's modular A-BUS offers a proven method to build your "custom" system today. Tomorrow, when you are ready to take another step, you will be able to add more functions. This is ideal for first time experimenting and teaching.

A-BUS control can be entirely done in simple BASIC or Pascal, and no knowledge of electronics is required!

An A-BUS system consists of the A-BUS adapter plugged into your computer and a cable to connect the Adapter to 1 or 2 A-BUS cards. The same cable will also fit an A-BUS Motherboard for expansion up to 25 cards in any combination.

The A-BUS is backed by Alpha's continuing support (our 11th year, 50000 customers in over 60 countries).

The complete set of A-BUS User's Manuals is available for $10.

About the A-BUS system:

- All the A-BUS cards are very easy to use with any language that can read or write to a Port or Memory. In BASIC, use INP and OUT (or PEEK and POKE with Apples and Tandy Color Computers)
- They are all compatible with each other. You can mix and match up to 25 cards to fit your application. Card addresses are easily set with jumpers.
- A-BUS cards are shipped with power supplies (except PD-123) and detailed manuals (including schematics and programming examples).

Relay Card RE-140: $129

Includes eight industrial relays, (3 amp contacts, SPST) individually controlled and latched. 8 LED's show status. Easy to use (OUT or POKE in BASIC). Card address is jumper selectable.

Reed Relay Card RE-156: $99

Same features as above, but uses 8 Reed Relays to switch low level signals (20mA max). Use as a channel selector, solid state relay driver, etc.

Analog Input Card AD-142: $129

Eight analog inputs. 0 to +5V range can be expanded to 100V by adding a resistor. 8 bit resolution (20mV). Conversion time 120us. Perfect to measure voltage, temperature, light levels, pressure, etc. Very easy to use.

12 Bit A/D Converter AN-146: $139

This analog to digital converter is accurate to .025%. Input range is −4V to +4V. Resolution: 1 millivolt. The on board amplifier boosts signals up to 50 times to read microvolts. Conversion time is 130ms. Ideal for thermocouple, strain gauge, etc. 1 channel. (Expand to 8 channels using the RE-156 card).

Digital Input Card IN-141: $59

The eight inputs are optically isolated, so it's safe and easy to connect any "on/off" devices, such as switches, thermostats, alarm loops, etc. to your computer. To read the eight inputs, simply use BASIC INP (or PEEK).

24 Line TTL I/O DG-148: $65

Connect 24 input or output signals (switches or any TTL device) to your computer. The card can be set for: input, latched output, strobed output, strobed input, and/or bidirectional strobed I/O. Uses the 8255A chip.

Clock with Alarm CL-144: $89

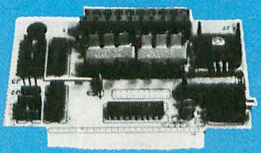
Powerful clock/calendar with: battery backup for Time, Date and Alarm setting (time and date); built in alarm relay, led and buzzer; timing to 1/100 second. Easy to use decimal format. Lithium battery included.

Touch Tone® Decoder PH-145: $79

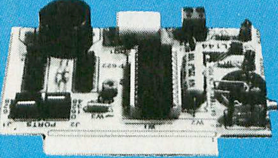
Each tone is converted into a number which is stored on the board. Simply read the number with INP or POKE. Use for remote control projects, etc.

A-BUS Prototyping Card PR-152: $15

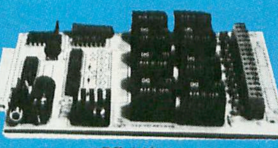
3½ by 4½ in. with power and ground bus. Fits up to 10 I.C.s



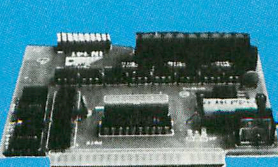
ST-143



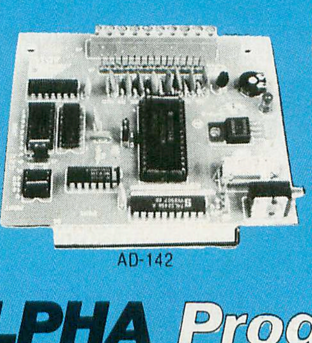
CL-144



RE-140



IN-141



AD-142

Smart Stepper Controller SC-149: $299

World's finest stepper controller. On board microprocessor controls 4 motors simultaneously. Incredibly, it accepts plain English commands like "Move arm 10.2 inches left". Many complex sequences can be defined as "macros" and stored in the on board memory. For each axis, you can control: coordinate (relative or absolute), ramping, speed, step type (half, full, wave), scale factor, units, holding power, etc. Many inputs: 8 limit & "wait until" switches, panic button, etc. On the fly reporting of position, speed, etc. On board drivers (350mA) for small steppers (MO-103). Send for SC-149 flyer.

Remote Control Keypad Option RC-121: $49
To control the 4 motors directly, and "teach" sequences of motions.

Power Driver Board Option PD-123: $89
Boost controller drive to 5 amps per phase. For two motors (eight drivers).

Breakout Board Option BB-122: $19
For easy connection of 2 motors. 3 ft. cable ends with screw terminal board.

Stepper Motor Driver ST-143: $79

Stepper motors are the ultimate in motion control. The special package (below) includes everything you need to get familiar with them. Each card drives two stepper motors (12V, bidirectional, 4 phase, 350mA per phase).

Special Package: 2 motors (MO-103) + ST-143: **PA-181: $99**

Stepper Motors MO-103: $15 or 4 for $39

Pancake type, 2¼" dia, ¼" shaft, 7.5°/step, 4 phase bidirectional, 300 step/sec, 12V, 36 ohm, bipolar, 5 oz-in torque, same as Airpax K82701-P2.

Current Developments

Intelligent Voice Synthesizer, 14 Bit Analog to Digital converter, 4 Channel Digital to Analog converter, Counter Timer, Voice Recognition.

A-BUS Adapters for:

IBM PC, XT, AT and compatibles. Uses one short slot.	AR-133...$69
Tandy 1000, 1000 EX & SX, 1200, 3000. Uses one short slot.	AR-133...$69
Apple II, II+, IIe. Uses any slot.	AR-134...$49
TRS-80 Model 102, 200. Plugs into 40 pin "system bus".	AR-136...$69
Model 100. Uses 40 pin socket. (Socket is duplicated on adapter).	AR-135...$69
TRS-80 Mod 3,4,4 D. Fits 50 pin bus. (With hard disk, use Y-cable).	AR-132...$49
TRS-80 Model 4 P. Includes extra cable. (50 pin bus is recessed).	AR-137...$62
TRS-80 Model I. Plugs into 40 pin I/O bus on KB or E/I.	AR-131...$39
Color Computers (Tandy). Fits ROM slot, Multipak, or Y-cable.	AR-138...$49

A-BUS Cable (3 ft, 50 cond.) CA-163: $24

Connects the A-BUS adapter to one A-BUS card or to first Motherboard.

Special cable for two A-BUS cards: CA-162: $34

A-BUS Motherboard MB-120: $99

Each Motherboard holds five A-BUS cards. A sixth connector allows a second Motherboard to be added to the first (with connecting cable CA-161: $12). Up to five Motherboards can be joined this way to a single A-BUS adapter. Sturdy aluminum frame and card guides included.

- The A-BUS is not a replacement for the Multi-pak.

**Add $3.00 per order for shipping.
Visa, MC, checks, M.O. welcome.
CT & NY residents add sales tax.
C.O.D. add $3.00 extra.
Canada: shipping is $5
Overseas add 10%**

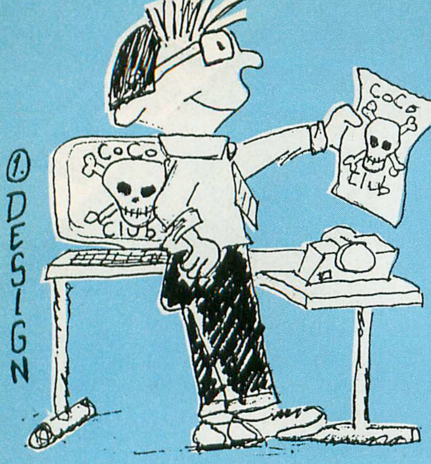
ALPHA Products
a Sigma Industries Company
242-W West Avenue, Darien, CT 06820

Technical info: (203) 656-1806
Orders only (Except in CT): 800 221-0916
Connecticut orders: (203) 348-9436
All lines open weekdays 9 to 5 Eastern time

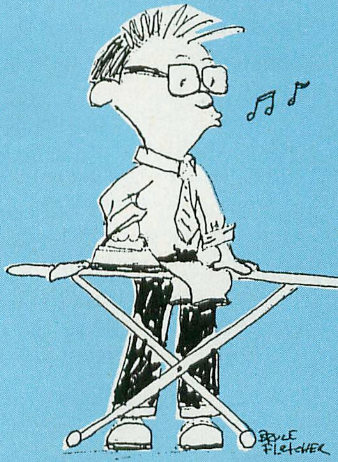
NEW FROM COLORWARE:

MAX·WEAR™

TRANSFERS



① DESIGN



② IRON

Special introductory offer:

$19.95

Eight 8 1/2 x 11" Sheets
Enough for 8 T–Shirts, etc.

Max–Wear transfers let you easily create your own Sweatshirts, T–Shirts, etc. **Max–Wear** transfers are 8.5 x 11" sheets of a special patented material. Anything your printer can print could be transfered to any cotton or cotton blend item.

You can use your own designs to make custom T–Shirts, Sweatshirts, caps, etc. Best of all, it's done in 3 easy steps. First use *CoCo Max*, (or any other graphics program) to create your design. Then print it on a **Max–Wear** transfer sheet with your regular printer and ribbon. (You can even print in color with the CGP–220, or add color with crayons if you wish.) The printed **Max–Wear** transfer sheet is then ironed onto the clothing, ready to wear! Of course, it's washproof.

SOME IDEAS: Cap insignia, Club T–shirts, Personalized gifts, Humorous underwear, Monograms, Pennants, etc.

WANTED
I LIKE LONNIE

③WEAR

Super Special

Free Font Disk

with your CoCo Max II
or CoCo Max III order

Please specify disk number when ordering.

See facing page for ordering information.

Disk #1

- Digital Small
- Digital Medium
- Digital Large
- Futura
- Grid Small
- GRID LARGE
- HAIFA
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- Victory
- Baby Teeth Small
- BABY TEETH LG.
- BOBO BOLD
- [illegible]
- Cartwheel
- Normande Small
- Normande Medium
- NORMANDE LG.
- Piano
- SINALOA
- sukiyaki

Disk #2

- [illegible]
- Harlow
- Koloss
- maharajah
- [illegible]
- Peignot Small
- Peignot Large
- PROGRAM SMALL
- PROGRAM MEDIUM
- PROGRAM LARGE
- [illegible]
- Futura Black Small
- FUTURA BLK. LG.
- [illegible]
- KEYBOARD
- LIQUID CRYSTAL
- Мосвоя Смеля
- Мосцоя Лapre
- ORBIT
- POINT OUT
- Printout Small
- PRINTOUT LARGE
- STOP

Disk #3

- [illegible]
- Bocklin
- Broadway
- BROADWAY ENG.
- Dot Matrix
- [illegible]
- Old English
- PIONEER
- URBAN
- Xerxes Small
- XERXES MEDIUM
- XERXES LARGE
- celtic
- HARTLAND
- Script
- SKYLINE
- [illegible]
- STENCIL
- [illegible]
- [illegible]
- Thin Man
- Tip Top
- [illegible]
- WOLT-AR

Disk #4

- APOLLO
- [illegible]
- CHINATOWN
- CINEMA
- ebony
- AAAAAA
- METAL
- rome
- odin
- SLICE
- [illegible]
- Cirque
- QUARTER
- COVERUP
- [illegible] coco
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- RELIEF
- Schwer
- Square
- [illegible]
- traffic
- [illegible]

FONT DISKS FOR **COCO MAX I, II AND III:**

Each: $24.95. SPECIAL: all 4 disks for only $49.95

COLORWARE

INTRODUCING THE NEXT GENERATION: CoCo Max™ III*

More Resolution   More Power   More Color   Built-in Animation   More Speed   More Type Styles   More Tools   Amazing Color Sequencing

"The best program ever written for the Color Computer"

That's how thousands of enthusiastic users rated the **CoCo Max II** drawing program. With **CoCo Max III** we are ready to amaze them again. Instead of "patching" CoCo Max II, we rewrote it from scratch to take advantage of the CoCo Max III hardware. The results will knock your socks off! Below is a brief list of some of the *new* features, but some, such as **animation**, **color sequencing**, or the **slide show**, have to be seen. Send for the Demo Disk, and see for yourself.

Everybody's favorite drawing package features:
- A 50% larger editing window. - Zoom area **400%** larger. - New drawing tools: **rays**, **3D cubes**, **arcs**,... - New editing tools: shadow, text size,... - Rotate by 1.5° steps - Select any 16 of the 64 possible colors (all 64 colors displayed at once!) - Powerful **color mix**: additive, subtractive, overlay,... - Full **color editing** of patterns and color changing patterns. - Incredible **special effects** with **color cycling** up to 8 colors with variable speed. -**Animation** adds the dimension of motion to your image. (Must be seen.) - Sophisticated data compression saves up to 70% of disk space when saving pictures.

In addition, there are dozens of enhancements to the multitude of features that made CoCo Max II a best seller.

More about CoCo Max III
- CoCo Max III is not an upgrade of CoCo Max II. It is entirely rewritten to take advantage of the new CoCo 3 hardware (More memory, resolution, colors, speed,...)
- The new CoCo Max III **Hi-Res Interface** and the CoCo Max II **Hi-Res Pack** are *not* interchangable.
- The new interface plugs into the joystick connector.
- The CoCo Max III disk is not copy protected.
- CoCo Max III only works with the CoCo 3.
- A Y-Cable or Multi-pak is not necessary.
- Colors are printed in five shades of gray.
- CoCo Max III can read CoCo Max II pictures.

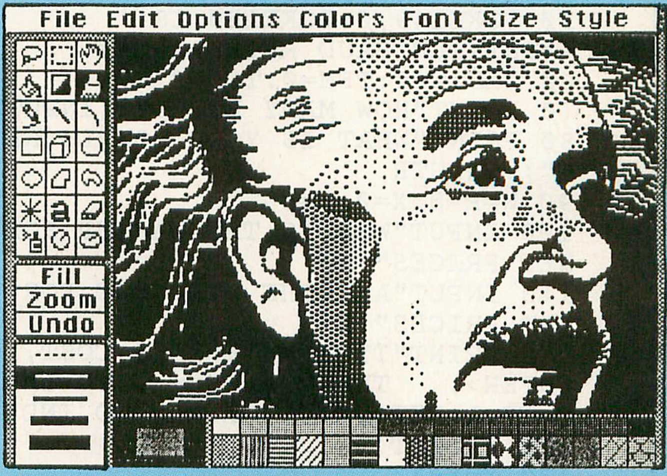
Note: CoCo Max II (for the CoCo 2) is still available on disk ($79.95). CoCo Max I is still available on tape ($69.95). For details, refer to our double page ad in any *Rainbow* from January '86 to July '87

Toll Free operators are for orders only. If you need precise answers, call the **tech line**. (Detailled CoCo Max specs are included with the Demo Disk.)

Add $3.00 per order for shipping.
Visa, MC, checks, M.O. welcome.
CT residents add sales tax.
C.O.D. add $3.00 extra.
Canada: shipping is $5
Overseas add 10%

Technical info: **(203) 656-1806**
Orders only Except in CT **800 221-0916**
Connecticut orders: **(203) 348-9436**
All lines open weekdays 9 to 5 Eastern time

* Beware of inferior imitations that *DO NOT* include a Hi-Res Interface or charge extra for each utility.



Imagine this picture in sixteen colors!

Guaranteed Satisfaction
Use CoCo Max for a full month.
If you are not delighted with it,
we will refund every penny.

System Requirements:
Any CoCo 3 disk system with a Joystick or a Mouse.

We apologize to tape users, CoCo Max III needs the flexibility of a disk.

The **CoCo Max III** system includes: • The special Hi-Res interface (for your mouse or joystick) • The CoCo Max III disk • Many utilities: (To convert Max II pictures, Max colors, etc.) • A detailled User's Manual. Complete system; nothing else to buy. **CoCo Max III: $79.95***

WITH COUPON ONLY

FREE DEMO DISK

Name
Street
City
State Zip
Printer used:

Please include $2 to help defray Processing and Shipping costs. (Check, Money Order, etc. Sorry, no COD or Credit Cards). Coupon (or copy) must be mailled to:

COLORWARE
A division of Sigma Industries, Inc.

COLORWARE
242-W West Avenue
Darien, CT 06820

```
220 ......209
370 .......58
510 ......152
END .....236
```

The listing: BILLGEN

```
10 '*  BILL GENERATOR           *
20 '*  BY SHAWN CONANT          *
30 '*  NOVEMBER, 1987           *
40 DIM J$(10):CLEAR1000
50 POKE149,0:POKE150,18:'
**PRINTER BAUD RATE-1200**
60 CLS:W=0:TFM=0:TCM=0
70 PRINT"HOW MANY HOURS";:INPUTH
80 PRINT"WHAT IS YOUR HOURLY RAT
E";:INPUTR
90 W=R*H:X=0:Z=0
100 INPUT"WHAT'S THE MARKUP FOR
NET PRICES";MU
110 INPUT"AND THE DISCOUNT FOR L
IST PRICES";D
120 PRINT"TYPE MATERIALS COST, <
ENTER>,   THEN PRESS <N> TO INDI
CATE A NET PRICE OR <L> TO INDIC
ATE A LIST PRICE"
130 X=X+1
140 PRINTX;:INPUTM:IF M=0THEN210
150 C$=INKEY$
160 IF C$<>"L"AND C$<>"N"THEN150
170 IFC$="N" THEN GOSUB620
180 IFC$="L"THEN GOSUB630
190 TPROF=TPROF+PROF:TFM=TFM+FM:
TCM=TCM+CM
200 GOTO130
210 CLS:PRINT"PROFIT=",:PRINTUSI
NG"$$####.##";TPROF
220 PRINT:PRINT"MATERIALS COST="
,:PRINTUSING"$$####.##";TCM
230 PRINT:PRINT"BILL MATERIALS-"
,:PRINTUSING"$$####.##";TFM
240 PRINT:PRINT"WAGES=",:PRINTUS
ING"$$####.##";W
250 PRINT:FB=TFM+W:PRINT"TOTAL B
ILL=",:PRINTUSING"$$####.##";FB
260 PRINT:PRINT"DO YOU WANT A BI
LL PRINTED?<Y/N>"
270 A$=INKEY$:IF A$<>"Y"AND A$<>
"N"THEN270
280 IFA$="N"THENEND
290 POKE282,0:'*UPPER/LOWER CASE
 DISPLAY*
300 INPUT"DATE-00/00/00";D$
310 INPUT"MAKE BILL TO:";N$
320 INPUT"STREET ADDRESS:";S$:IN
PUT"CITY:";CI$:INPUT"STATE";ST$:
INPUT"ZIP";Z$
330 CLS:POKE1110,246:Z=Z+1
340 LINE INPUT"JOB DESCRIPTION:
<ENTER> TO END ";J$(Z)
350 IFJ$(Z)=""THENGOTO360ELSEGOT
O330
360 INPUT"HOW MUCH DOWN PAYMENT"
;DO:BAL=FB-DO
370 POKE282,255:FORX=1TO2
380 FORY=1TO6:PRINT#-2:NEXTY
390 PRINT#-2,TAB(40),"John Doe":
PRINT#-2,TAB(40),"Main Street":P
RINT#-2,TAB(40),"Hometown, Vt. 0
5905"
400 PRINT#-2,TAB(40),D$
410 PRINT#-2:PRINT#-2,TAB(10),N$
420 IFS$=""AND CI$=""ANDST$=""TH
ENGOTO440
430 PRINT#-2,TAB(10),S$:PRINT#-2
,TAB(10),CI$", "ST$", "Z$
440 PRINT#-2:PRINT#-2
450 FOR Y=1TOZ:PRINT#-2,TAB(10),
J$(Y):NEXTY
460 PRINT#-2:PRINT#-2,TAB(30),"L
abor=",:PRINT#-2,USING "$$####.#
#";W
470 PRINT#-2:PRINT#-2,TAB(30),"M
aterials=",:PRINT#-2,USING"$$###
#.##";TFM
480 PRINT#-2:PRINT#-2,TAB(30),"T
otal=",:PRINT#-2,USING"$$####.##
";FB
490 IF DO=0 THEN GOTO530
500 PRINT#-2:PRINT#-2,TAB(30),"R
eceived=",:PRINT#-2,USING "$$###
#.##";DO
510 PRINT#-2:PRINT#-2,TAB(30),"B
alance due=",:PRINT#-2,USING"$$#
###.##";BAL
520 PRINT#-2,CHR$(27);CHR$(31):'
**BOLDFACE**
530 PRINT#-2:PRINT#-2,TAB(30),"T
hank You!"
540 PRINT#-2,CHR$(27);CHR$(32):'
**END BOLDFACE**
550 IF X=1THENPRINT#-2,CHR$(12):
'**FORM FEED**
560 NEXT X
570 FORY=1TO6:PRINT#-2:NEXTY
580 PRINT#-2:PRINT#-2,TAB(30),"M
aterials cost=",:PRINT#-2,USING"
$$####.##";TCM
590 PRINT#-2:PRINT#-2,TAB(30),"P
rofit",:PRINT#-2,USING"$$####.##
";TPROF
600 PRINT#-2,CHR$(12):'
**FORMFEED**
610 END
620 PROF=M*(MU/100):FM=M+PROF:CM
=M:RETURN
630 PROF=M*(MD/100):FM=M:CM=M-PR
OF:RETURN
```

Prospect, Kentucky
Vol. 2
No. 5

Reporter: Cray Augsburg
Photographer: Ed Ellers

RAINBOW FEST®

PRINCETON OCT. 9-11

R·E·P·O·R·T·E·R

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CoCo Past, Present and Future at Princeton RAINBOWfest

The 14th RAINBOWfest opened at 7 p.m., Friday, October 9, 1987. It was cold outside, but inside, it was all warmth and happiness. As some people jammed the aisles in an attempt to find those long-awaited bargains, others took the time to relax and meet with old and new friends.

On Saturday morning, many early risers attended the traditional CoCo Community Breakfast. Sharing the head table with Lonnie Falk, RAINBOW's editor and publisher, were many CoCo notables including RAINBOW contributing editors Marty Goodman, Dale Puckett and Richard Esposito, Delphi personalities Greg Law and Don Hutchison, RAINBOW Managing Editor, Jutta Kapfhammer, and Executive Editor, Jim Reed. Also seated at the head table were Tandy dignitaries Barry Thompson, Mark Siegel, Fran McGehee and Srini Vasan.

Jim Reed delivered the keynote address concerning where the CoCo Community has been, where it is now and where it is going. Jim also offered personal accounts of some of the more humorous incidents at RAINBOW over the years.

Over 10,000 people attended the Princeton show.

The CoCo Community Breakfast offers early risers a chance to relax and reflect before the exhibit hall opens.

In closing, Jim took a few minutes to roast his employer, Lonnie. Fortunately, for Jim's sake, Lonnie was in an excellent mood.

Saturday's seminars, which covered everything from hardware hacking to OS-9, were very well attended.

Sunday's exhibit hall activities gave way to many great bargains and the showroom maintained a "get that good deal" atmosphere.

Attendees got answers to their questions at the show.

New Hardware on CoCo Horizon

A hardware hacker finds parts bargains.

At the Disto booth, Tony DiStefano announced that he has designed a new Super Controller, the SC-2. This high-performance disk controller will have "no wait" operation under OS-9. Tony indicated that interest in this new product was extremely high.

Also in the works is a new mini-bus system that will give the CoCo user great flexibility in setting up a CoCo system.

Sardis technology sold out of their Dual Mode Controller (DMC) at the Princeton show and then sold "seconds" for $30 off the regular price of $149.50 and good units for $15 off.

The DMC allows "no halt" operation under OS-9. Its second mode gives the user complete compatibility when using Disk BASIC.

At Owl-Ware, disk drives seemed to be the main target, as Drive 0 systems were going for $139 and a Drive 1 could be had for $85 (bare drives were $45). Also, 10Mb hard drive systems were priced at $439 and 20Mb drives sold for $659.

Owl-Ware has answered many a CoCoist's prayers by introducing an IBM keyboard adapter. This unit is designed to convert the signals from any standard IBM-type keyboard for the CoCo, and will retail for $119.

The winner of Owl-Ware's "Name the Owl" Contest was Robby Allen for his entry of "Wholio." For his inspiration, Robby received a prize worth $250.

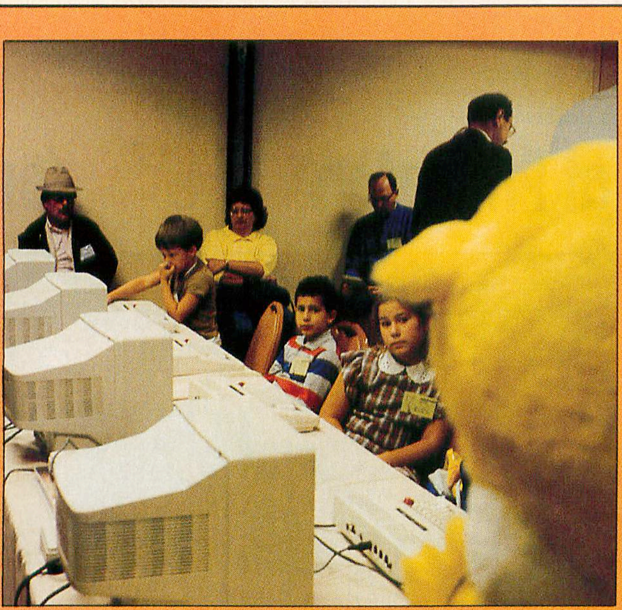
A newcomer to the Princeton show was Burke & Burke. They were offering the CoCo XT and CoCo XT-RTC.

The CoCo XT is a hard disk interface designed to accept standard Western Digital hard drive controllers and allow connection of a standard hard drive to a CoCo via the Multi-Pak Interface.

The CoCo XT-RTC is similar to the CoCo XT except that it includes a real-time clock. The CoCo XT retails for $69.95 and the RTC version retails for $99.95.

Drives were the story at the Southwestern Digital booth. Here you could pick up a single-sided Drive 0 for $109 or a double-sided Drive 0 for $129.

The HDS disk controller kit went for $40, while a fully assembled unit with ROM sold for only $60.



The CoCo Cat Educational Sandbox attracted many of the younger CoCo experts.

Radio Shack Offers Two 100% Discounts!

Radio Shack opened the show Friday night selling CoCo 3s for $100. Saturday, however, they raised the price to $115.

Other bargains included the DMP-130 for $239, FD-501 Drive 0 for $175, DMP-106 printer for $159.95, CM-8 monitor for $239.95, and the DWP-230 printer for $289.95.

The single-button mouse was selling for just $20. 64K CoCo 2s went for $29.95 and 16K machines sold for a mere $9.95. Needless to say, they went fast!

In addition to the above bargains, Radio Shack brought in boxes of 64K chips (500 kits, 16 chips to the kit) and the Plug & Power Controllers (4600 units, retailing for $99.95) and gave them away as freebies!

Manager John Hutchinson said, "The CoCo market is definitely alive and well . . . it is thriving!"

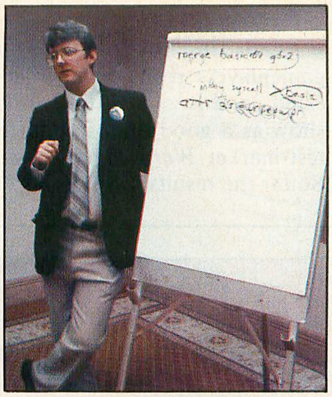
Tandy executives Mark Siegel, left, and Barry Thompson, right, get assistance from CoCo Cat.

CoCo Club Supports 'fest

To support the CoCo Community and to help RAINBOW, the Mercer County Color Computer Club attended the 'fest in force.

They were there selling Princeton '87 *T-shirts*, as well as tickets for their own club raffle. The club members always had time for helping attendees find their way around and for offering information and answers to the many questions that were asked. As usual, their presence was a big help and it is greatly appreciated.

Tandy's Fran McGehee helps at the Radio Shack booth.

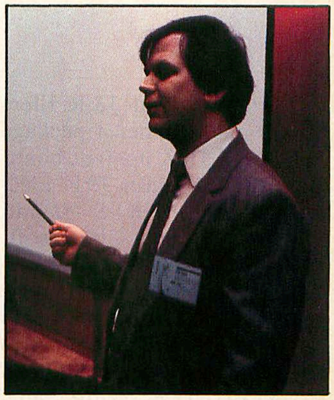


RAINBOW Technical Editor Cray Augsburg deals with OS-9.

Chocolate CoCos On a Stick!

In addition to bringing their complete line of educational software, Computer Island had boxes of 10 double-sided, double-density disks for only $5. One of the items many people stocked up on, though, were the chocolate computer lollipops!

Usernames and User Faces



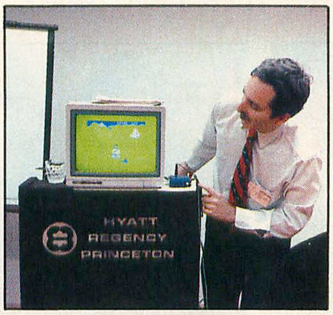
Greg Law (above) of the OS-9 Online SIG was on hand to field the latest questions, as was Don Hutchison, the CoCo SIG database manager. John Gibney and Paul Hodosh were also available as representatives of the Delphi system.

Sight and Sound from Dr. Preble's Programs

The first thing many people saw when they entered the exhibit hall in Princeton was Dr. Preble's booth. On a CoCo screen was a digitized image of Dr. Larry Preble. In the background, one could hear his digitized voice.

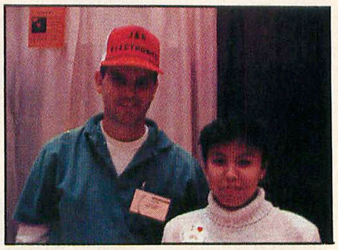
Vocal Freedom, a digital voice recorder, caught the attention of many. This program allows the user to record speech using a CoCo 1, 2 or 3 and was selling for $29.95. It allows several minutes of speech to be recorded on a 512K machine, and doesn't use up memory for silent sections of the speech.

"The show is wonderful," Dr. Preble said. "It has been a while since the last show we attended, and the people are still really great!"



Dr. Larry Preble demonstrated some of his unique software at the "CoCo As a Mind Interface" seminar.

Cheryl and Shari Blyn of Computer Island rest a moment.



Jessie Jackson and Mona Rowe of J & R Electronics offered complete 512K upgrades, with software, for $99.95

Clearly OS-9 at Clearbrook

Paul Kehler of Clearbrook Software Group spent a great deal of time demonstrating *CSG IMS*, a relational database manager; *Serina*, a system mode debugger; *Erina*, a symbolic user-mode debugger; and *MSF*, an MS-DOS file manager.

MSF, which was selling for one-third off the regular price of $45, allows the direct use of MS-DOS disks under OS-9.

"Other than problems with customs (at the Canadian border), things are really going well for us, Mr. Kehler said. "And we are happy to be here."

Graphics Going Strong

Graphics has always been the name of the game at Computize. At RAINBOWfest their big special was a bundled software package worth $179 selling for $69.95.

The bundle included *Color Max 3 Deluxe, Picture Converter, BASIC Tool and Gallery*, and several utilites.

Also, since this was the first show for *Color Max 3 Deluxe*, upgrades were available for those who had purchased the original *Color Max 3*. Over a hundred attendees were able to take advantage of this $15 offer (this offer is still in effect through Computize). On hand to answer questions were *Color Max 3* programmers Erik Gavriluk and Greg Miller.

At Diecom, the *RAT* graphics design package was selling for $59.95.

RAT includes its own high-quality optical mouse and mouse pad and is a full-featured design package for the CoCo 3.

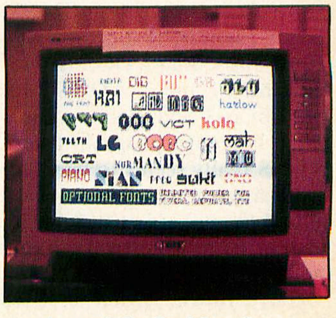
Diecom President David Dies said, "In the future, we hope to provide several games designed to work with the Light Phaser like *Iron Forest* does."

This was the RAINBOWfest debut of Colorware's new *CoCo Max III*, a full-featured graphics development program.

CoCo Max III resembles *CoCo Max II* except that it has three columns of icons on the left side of the screen, allowing the selection of the many new features.

The option of a free *Max Font* disk ($24.95 value) or the purchase of a complete font library (nearly 100 fonts) for $29.95 was included in the cost of *CoCo Max II* for $79.95.

While it wasn't for sale, one of the show stoppers in Princeton was a homemade robotic arm designed by John Monin. The arm was driven with the Alpha Products A-Bus and controlled by a standard CoCo.



A view of *CoCo Max 3*

CoCo 3 Well Supported

Gimmesoft and J&R Electronics put together a package including a 512K upgrade board (0K installed) from J&R Electronics, and *FKEYS III* and *SIXDRIVE* from Gimmesoft. The package sold for $69.95.

Gimmesoft was offering their new Multi-Pak Interface Locking Plate for $7.95. They also offered special deals on *FKEYS III*, *SIXDRIVE*, *Multi-Label* and *Custom Palette Designer.*

At Microcom, the hottest item was *Super Tape/Disk Transfer*. In addition, Microcom sold 10 of the Intronics EPROM programmers.

Said Manohar Santwani, owner of Microcom, "What we have seen indicates that people really want to get into the programming end of the machine.

Sharing a booth with Microcom was Spectrum Projects. According to Bob Rosen, "The CoCo 3 has really hit well. We've sold more products for it than anything else at this show."

The hot item at the Sugar Software booth was the *Calligrapher* combo, a package that included *CoCo Calligrapher* and 54 fonts for $69.95.

Another big seller was *Galactic Hangman*, a graphics version of the popular word game.

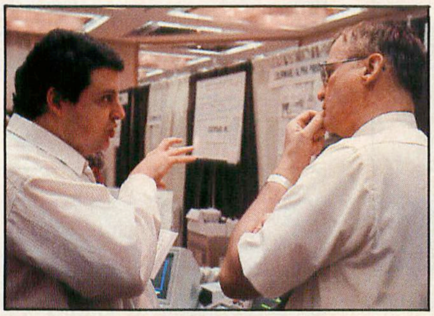
Bob Hengstebeck was marketing a new program sure to be of interest to serious OS-9 users, *The Hard Disk Organizer* — a compiled C program designed to allow users to develop menu-driven pathlists so that applications can easily be accessed from the hard drive. The price for *The Hard Disk Organizer* is $24.95.

Art Flexser, of Spectro Systems, was selling ADOS 1.02 for the CoCo 1 and 2, ADOS-3 for the CoCo 3 and *Peeper*, a machine language program tracer. ADOS really seems to be a hotseller anywhere it goes since it allows the user to customize his system from a software standpoint.

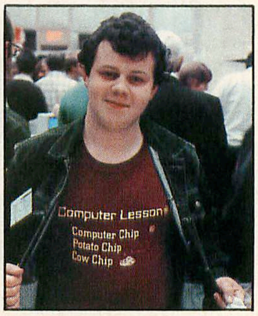
Steve Bjork, owner of SRB Software, was busy demonstrating his new product, *Warp Fighter 3-D*. This space simulation game utilizes features of the CoCo 3 along with game enhancements through 3-D technology.

According to Steve, "The gameplayers really seem interested in this one. I took this show as a good opportunity to test-market *Warp Fighter 3-D*. So far the results are pleasing."

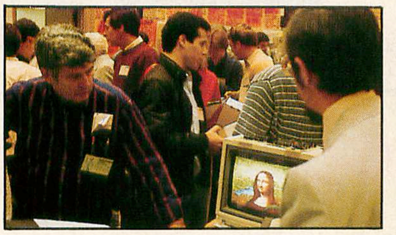
Barry Thompson fields a question at the "Talk to Tandy" seminar.



Mark Siegel, left, and Dale Puckett.



A lesson to learn!



***DaVinci 3* attracts attention.**

Breakfast speaker Jim Reed, left, and Lonnie Falk.

Goodies Galore

"Everything seems to be selling equally well. The stand-outs are the Magnavox monitor and the 512K upgrades," said Fran Purcell of Computer Plus. "These are really hot."

"As people move into the CoCo 3 and begin using OS-9, we are seeing an excellent market for new hardware and software offerings," Fran said.

While competition in the disk drive market was stiff in Princeton, Howard Medical had little difficulty selling their Drive 0 system for a show special of $178.45.

Of the show, Manager Ross Litton said, "We have seen many different people here at the RAINBOWfest and all of them seem to share a common goodwill."

Bargains to be found at the Microworld booth included the DMP-130A for $215 and the CM-8 monitor for $239.

All software went for 20 percent off the regular price. Also, CoCo 3s were available for only $115, brand new in the box. You could even pick up a pair of joysticks for $10.

Direct from Mt. Sivai: Saint John

This was the first RAINBOWfest exhibit for R.J. Babich and family of Mt. Sivai, New York. Their company, The St. John Gallery Press and Software, offered several utilities, including a feature-packed disk editor.

The feature offering was *Astro Fortune Teller*, which completely fills a disk, yet, due to a modular approach, runs on any system having at least 32K. Another big seller was *The Best BBS*, which was going for $12.

T & D "Expecting" Great Things

At T & D Subscription Software, a one-year subscription was going for $60 for tape and $70 for disk. Each of their 64 issues contains 10 programs and was being sold at a show special of just $5.

The story of Tom and Marianne Dykema, owners of T & D, has taken an exciting twist. It seems they will be hearing the pitter-patter of little feet around their home in early May. Best wishes and lots of luck to them!

Public Domain: The Library's Growing

Public Domain Software Copying Company ran a last-day special in which the user could purchase any 10 disks from the 36-disk library for only $25. And the complete library was going for $75.

In addition to CoCo software, Public Domain also had several offerings in their MS-DOS library.

Public Domain's Al Zucker said, "By the Chicago show in '88 we expect to have a complete CoCo 3 library. We think this is a big need in the Community right now."

Telewriter-128™

the Color Computer 3 Word Processor

For over 5 years now, Telewriter has been the #1 Color Computer word processor, both in popularity and in performance. Telewriter's near perfect mix of sophisticated professional features and a very natural user interface, has earned it the highest praise in numerous magazines, and an intensely loyal following among tens of thousands of Color Computer users all over the world.

HISTORY

Throughout the history of the Color Computer, Telewriter has pioneered software breakthroughs that set the standards.

In 1981, it was Telewriter 1.0 that first took the Color Computer's inadequate 32X16 all-uppercase display, and replaced it with a graphics-based 51X24 upper and lowercase display.

A few years later, Telewriter-64 added high density 64X24 and 85X24 displays and access to the full 64K of the newer Color Computers.

THE NEW AGE

Today, Telewriter-64 is recognized as the standard Color Computer word processor. It runs on all Tandy Color Computers — from the original Color Computer 1, to the Color Computer 2, and 3.

But the Color Computer 3 brings a whole new level of power to low cost computing and, so, a new Telewriter is here to put that power to work for you. We call it Telewriter-128.

TELEWRITER-128

You don't mess with a good thing, so Telewriter-128 is still Telewriter-64 at heart. The commands, and the user interface are essentially the same. If you know Telewriter-64, then you already know Telewriter-128. And, if you don't know Telewriter-64, you'll still have an easy time learning and using Telewriter-128.

80 COLUMNS

But there are major differences as well. First, Telewriter-128 uses the Color Computer 3's new 80 column screen display.

This means, simply, that using Telewriter-128 on a low cost Color Computer 3 will look a lot like using a more expensive word processor on a much more expensive IBM PC, PS/2, or clone.

SPEED

Second, Telewriter-128 is lightning fast. Telewriter-64 was fast in its own right, but, by accessing the Color Computer 3's video hardware directly, and by running the machine in double speed mode, Telewriter-128 is able to provide extremely fast scrolling and instant paging — functions whose speed is crucial to serious word processing.

In this department, Telewriter-128 doesn't simply keep up with IBM-based word processors — it generally surpasses them!

EASE

Third, Telewriter-128 adds a host of new features big and small, that make it even easier to use.

Features like: Quick function key access to the editor or the menus — an instant on-line help screen summarizing all Telewriter commands and special characters — an option file where you store your personal set of format and screen settings so you only have to set them once!

Then, there's a quick save feature which allows you to save all your current work without leaving the editor. There's a simple way to cursor through the disk directory and read in a file by just hitting ENTER. And there's more.

NEW POWER

Telewriter-64 always had the power to handle any kind of serious writing, from letters to textbooks. But, here too, Telewriter-128 adds major features.

Like Macros — which let you insert whole words or phrases (even sets of control codes or format commands) into your text, with a single keypress. And every time you power up Telewriter-128, the macro definitions are automatically loaded*, so they're always there.

Then there's a Print Preview feature that shows you, on-screen, the way your printed text will look — with margins, headers, centering, justification, page numbering, and page breaks. This guarantees letter perfect documents every time, and makes tasks like widow/orphan line elimination, a breeze.

TELEWRITER-64 OR TELEWRITER-128

We could go on listing features, but the point is this: If you own a Color Computer, you already have the hardware for the most powerful, low cost word processor in town. All you need now is to add the heart and soul:

Telewriter-64, for the Color Computer 1 and 2, costs $59.95 on disk, $49.95 on cassette.

Telewriter-128 for the Color Computer 3 costs $79.95 on disk, $69.95 on cassette.

To order by Mastercard or Visa call (619) 755-1258 anytime, or send check or money order plus $2 shipping (Californians add 6% sales tax) to:

COGNITEC
704 Nob Ave.
Del Mar, CA 92014

To upgrade from Telewriter-64 to Telewriter-128, return your original disk or cassette with $39.95. (Add $10 if you're also upgrading from cassette to disk. Deduct $10 with proof of Oct '87 - Feb '88, purchase of Telewriter-64.)

> *When I first got Telewriter-64 last year, I was in heaven. I couldn't believe the program's versatility and ease of use.*
> -The RAINBOW, Oct. 1985

TELEWRITER-64 FEATURES: Compatibility with any printer that works with the Color Computer; embedded control codes for underlining, boldface, sub/superscript, variable fonts; format commands for headers, centering, margin and spacing changes anywhere in the document; Format menu to set margins, spacing, page numbering, BAUD rate, lines per page, justification; Chain printing for one shot printing of multi-file documents. Fast, full-screen editor with wordwrap, block copy/move/delete, global search and replace, wild card search, fast 4-way auto-repeat cursor, fast scrolling, forward and backward paging, text alignment, tabs, error protection, word and line counter. Insert or delete text anywhere on the screen. Simple, easy to remember commands. Optional ASCII files for compatibility with spell checkers, terminal programs, and BASIC. Load, save, append, partial save files to disk or cassette. Kill, rename and list disk files. Cassette verify and auto-retry on error.

TELEWRITER-128 - ADDITIONAL FEATURES: Print preview from editor; multiple copy print; footers; hanging indents; cursor thru disk directory to load, append, rename and kill files; quick file save from editor; keyclick; key repeat; true block move; 24, 25, or 28 line screen; 40 or 80 column screen; dual speed cursor; on-line help; overstrike mode; word delete; wordwrap at margin; user definable macros; nested macros; instant status window for information on cursor position, word count, etc.; instant function key access to menus or editor; options menu for setting character and screen colors, key repeat and delay rates, definable foreign symbols.

IBM and PS/2 are trademarks of International Business Machines Inc. *disk version only

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- PENGUIN

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5 13 21 29 37 45 53 61
6 14 22 30 38 46 54 62
7 15 23 31 39 47 55 63
8 16 24 32 40 48 56 64

PLEASE CIRCLE
TAPE or DISK

A utility to help you decide whether
or not to market your product

Advertising Profit Predictor

By Bill Bernico

Most of you RAINBOW readers have probably written at least one really good program you've considered marketing commercially. Being a first-timer, you're probably a little leery about shelling out the advertising dollars necessary to get the project off the ground. You're not quite sure what your chances are for success.

If some of your questions could be answered, would you take a chance? *Advertising Profit Predictor* helps answer some of those questions and puts things in their proper perspective.

Run the program and we'll go through it together. First, you're asked for the number of people who subscribe to the publication you're considering (total paid circulation). This is important because it gives you an idea of how many potential buyers are out there for you. You can find circulation figures somewhere in the front of most magazines. If you don't see the figure there, write the company and ask.

Next, input the selling price of the product you're marketing. After that, enter your cost per unit. In other words, take into consideration things like blank disks or tapes, envelopes, stamps, etc. This is your cost per unit. After you've entered this amount, enter the cost of the magazine ad. To simplify this example, enter the cost of a one-time ad. When you've entered this amount, the display will show your profit per unit.

All right, so now you know how much you could make on each transaction. What does this translate to in terms of a mass audience? To find out, press any key and you'll be taken to the statistics section.

From here you can break things down three different ways. Let's try each way and see what happens. I'll give you some sample figures to work with; when you get familiar with the program's operation, simply substitute your own actual figures.

For circulation, let's use 75,000 as a round figure. For a selling price, try $9.95. Let's assume your cost per unit is $4.00. For an ad price, enter $235.00. Your profit per unit should be $5.95 less the price of the ad. OK, now we're at the statistics section.

First, let's try Option 2. Enter an amount that you see as your goal. In other words, when all is said and done, how much money do you want to make on this venture? For this sample, input $5000.00 to see the outcome. The display will show that in order to make $5,000, you'll need to sell 840 units. This also means that you have to capture only 1.1 percent of the magazine's readers. After deducting the cost of the ad, you will net a profit of $4,765. Not bad!

Now that you know it takes only a small percentage of readers to respond, let's try Option 1. It asks you what percentage of the readers you think you can sell to. Try 3 percent as an example. You'll notice that selling to only 3 percent of those 75,000 readers results in a sale of 2,250 units with a profit of $13,387.50 less the $235 for the ad. Still, you're left with a whopping $13,152.50 for your efforts. Now we're talking big business.

Finally, let's try Option 3. Suppose you jumped ahead of yourself and anticipated selling a certain number of units. Suppose you have already bought 1,000 blank disks, 1,000 envelopes and 1,000 stamps. What will it take to move all those units out? That's the question Option 3 will answer. Input 1000 at the prompt. The program then tells you that if you do, indeed, sell your 1,000 units, you have sold to 1.3 percent of the readership. You will also have made $5,950 dollars in the attempt (less the $235 for the ad). Your net profit is $5,715. Still want to debate whether or not to spend money to advertise your product?

With this program, you can also do a lot of "what if" predictions. For example, *if* the price and cost figures stay the same but the circulation goes up, so does your chance for success. *If* you can lower your cost but the selling price stays the same, your profit goes up. *If* you try for that extra percentage of readers, what will that mean to you in additional profits? See what I mean? *Advertising Profit Predictor* can answer lots of marketing questions.

Don't let your fear of initial costs keep you from marketing what you consider to be a top-notch program. The readers are waiting for your program. Simply have faith in yourself, offer a good product at a fair price and deliver what you promise. The rest is easy.

(Questions or comments about this program may be directed to the author at 708 Michigan Ave., Sheboygan, WI 53081. Please enclose an SASE when writing for a reply.) ☐

Bill Bernico is the author of over 200 Color Computer programs and is a frequent RAINBOW contributor whose hobbies include golf, writing music and programming. Bill is a drummer in a rock band and lives in Sheboygan, Wisconsin.

The listing: ADPROFIT

```
1 'ADVERTISING PROFIT PREDICTOR
2 'by Bill Bernico
3 B$=STRING$(32,140)
4 BB$=STRING$(32,131)
5 CLS:INPUT"HOW MANY SUBSCRIBERS
 DOES THIS  PUBLICATION HAVE";S
6 PRINTB$;:LINEINPUT"WHAT IS THE
 SELLING PRICE OF     YOUR PRODUC
T $";SF$
7 SF=VAL(SF$)
8 PRINT B$;:LINEINPUT"HOW MUCH D
OES EACH UNIT COST YOUTO PRODUCE
 $";CP$
9 CP=VAL(CP$)
10 PRINT B$;:LINE INPUT"WHAT IS
THE PRICE OF AN AD IN   THIS PUB
LICATION $";AD$
11 AD=VAL(AD$)
12 PRINT B$;:PRINT"YOUR PROFIT P
ER UNIT IS $";SF-CP
13 PRINT"(LESS THE PRICE OF THE
AD)"
14 PRINT B$;
15 PRINT@483,"HIT ANY KEY FOR ST
ATISTICS";
16 FOR X=1504 TO 1535
17 POKE X,PEEK(X)-64:NEXT X
18 IF INKEY$=""THEN 18
19 CLS:PRINT@7,"AVAILABLE OPTION
S
20 FOR X=1024 TO 1055
21 POKE X,PEEK(X)-64:NEXT X
22 PRINT BB$;:PRINT"1. ESTIMATE
THE PERCENTAGE          OF BUYERS
 YOU THINK YOU          CAN SELL
YOUR PRODUCT TO
23 PRINT B$;:PRINT"2. ESTIMATE P
OTENTIAL NET            PROFIT YOU
 CAN MAKE IF            YOU ADVERT
ISE YOUR                PRODUCT.
24 PRINT B$;:PRINT"3. ESTIMATE N
UMBER OF                POTENTIAL
BUYERS FOR              YOUR PRODU
CT.
25 PRINT B$;:PRINT@490,"SELECT (
1-3)";
26 FOR X=1504 TO 1535
27 POKE X,PEEK(X)-64:NEXT X
28 A$=INKEY$:IF A$=""THEN 28
29 A=VAL(A$):ON A GOTO 31,40,55
30 GOTO 28
31 A=SF-CP:CLS:PRINT"WHAT PER CE
NTAGE OF THE"S
32 INPUT"READERS DO YOU THINK YO
U CAN    SELL";PS
33 PB=(S*PS)/100
34 PRINT B$;:PRINT"IN ORDER TO C
APTURE"PS;"%"
35 PRINT"OF THE MARKET, YOU'LL H
AVE TO   SELL";INT(PB);"UNITS. Y
OUR PROFIT
36 PRINT"WILL BE $";PB*A
37 PRINT"MINUS $"AD"FOR THE AD
38 PRINT"NETTING YOU $"(PB*A)-AD
39 PRINT BB$;:GOTO 67
40 PR$="###.#":CLS
41 LINE INPUT"WHAT PROFIT FIGURE
 ARE YOU       AIMING FOR $";PF$
42 PF=VAL(PF$)
43 A=SF-CP
44 TP=INT(PF/A)
45 PR=(TP/S)*100
46 PRINT B$;:PRINT"IN ORDER TO M
AKE $";PF
47 PRINT"YOU'LL NEED TO SELL"TP"
UNITS
48 PRINT"OR";
49 PRINT USING PR$;PR;
50 PRINT"% OF THE READERS.
51 PRINT"DEDUCT $"AD"FOR THE AD
52 PRINT"AND YOU STILL NET $"PF-
AD
53 PRINT BB$;
54 GOTO 67
55 PR$="###.#":A=SF-CP:CLS
56 INPUT"HOW MANY UNITS DO YOU T
HINK YOU CAN REALISTICALLY SELL"
;NB
57 PRINT B$;
58 PRINT"IF YOU'RE ABLE TO SELL"
NB
59 PRINT"UNITS, YOU WILL HAVE SO
LD TO
60 PRINT USING PR$;(NB/S)*100;
61 PRINT"% OF THE READERS.
62 PRINT"YOUR PROFIT ON THIS TRA
NSACTION
63 PRINT"WILL BE $"NB*A
64 PRINT"MINUS $"AD"FOR THE AD
65 PRINT"NET PROFIT IS $"(NB*A)-
AD
66 PRINT BB$;
67 PRINT@481,"nEW FIGURES  sAME
FIGURES  eND";
68 F$=INKEY$:IF F$=""THEN 68
69 IF F$="N"THEN 5
70 IF F$="S"THEN 19
71 IF F$="E"THEN CLS:END
72 GOTO 68
```

RAINBOW
FEST
CHICAGO MAY 20-22

RAINBOWfest is the only computer show dedicated exclusively to your Tandy Color Computer.

Nowhere else will you see as many CoCo-related products or be able to attend free seminars conducted by the top Color Computer experts. It's like receiving the latest issue of THE RAINBOW in your mailbox!

RAINBOWfest is a **great opportunity** for commercial programmers **to show off new and innovative products for the first time. Chicago is the show** to get information on capabilities for the new CoCo 3, along with a terrific selection of the latest CoCo 3 software. In exhibit after exhibit, there will be demonstrations, opportunities to experiment with software and hardware, and special RAINBOWfest prices.

Set your own pace between visiting exhibits and attending the valuable, free seminars on all aspects of your CoCo — from improving BASIC skills to working with the sophisticated OS-9 operating system.

Many people who write for THE RAINBOW — as well as those who are written about — are there to meet you and answer questions. You'll also meet lots of other people who share your interest in the Color Computer. It's a person-to-person event and a tremendous learning experience in a fun and relaxed atmosphere.

A special feature of RAINBOWfest is the **Educational Sandbox,** which features **child-oriented workshops** to give hands-on experience to an age group often neglected. There are sessions for the kindergarten through third-graders, and for fourth- through seventh-graders. And, as an additional treat for CoCo Kids of all ages, we've invited frisky feline CoCo Cat to join us for the show. RAINBOWfest has something for everyone in the family!

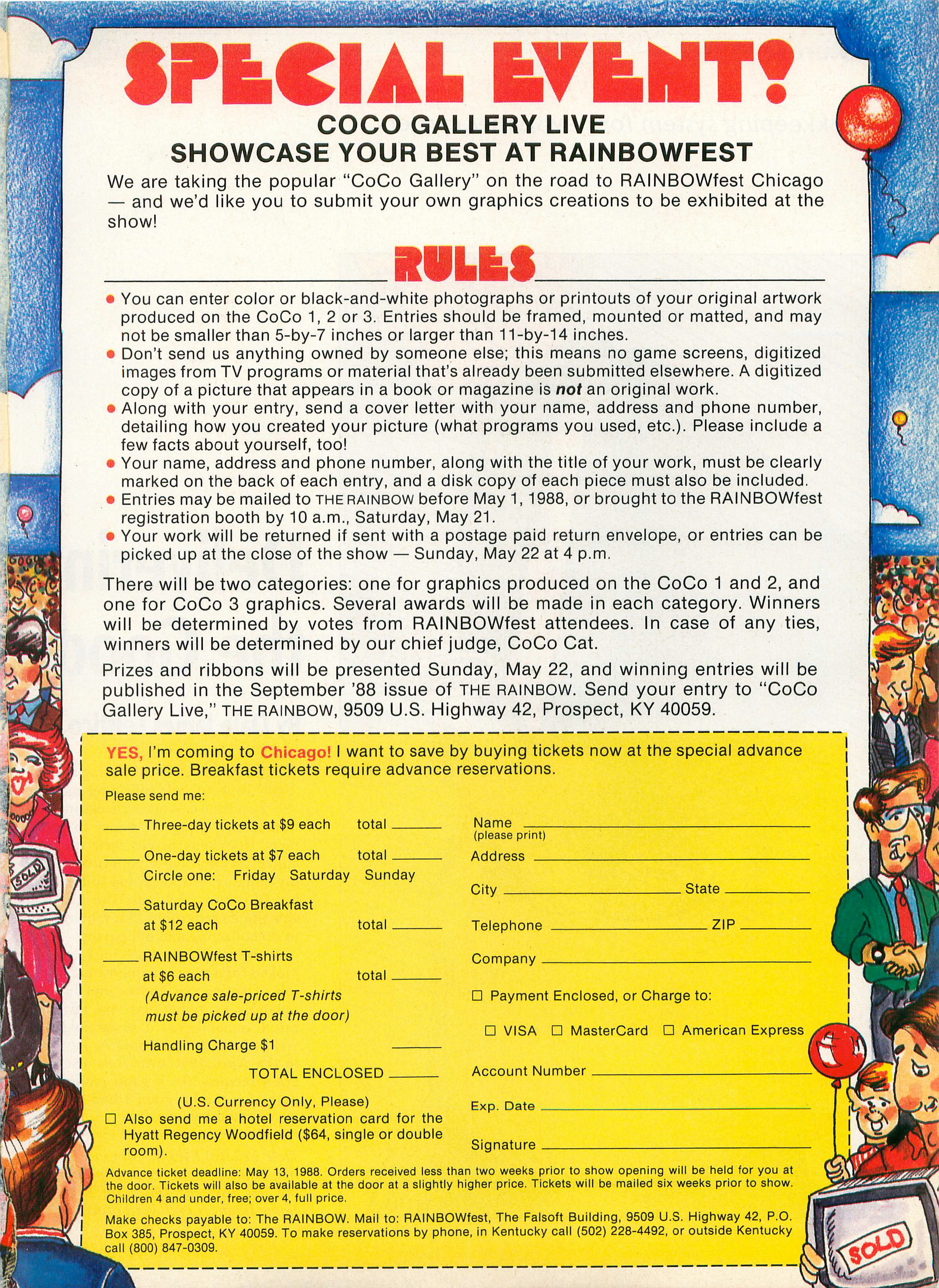
If you missed the fun at our last RAINBOWfest in Princeton, why don't you make plans now to join us in Chicago? For members of the family who don't share your affinity for CoCo, there are many other attractions in the Chicago area.

The Hyatt Regency Woodfield offers special rates for RAINBOWfest. **The show opens Friday evening** with a session from 7 p.m. to 10 p.m. It's a daytime show Saturday — the CoCo Community Breakfast (separate tickets required) is at 8 a.m., then the exhibit hall opens promptly at 10 a.m. and runs until 6 p.m. On Sunday, the exhibit hall opens at 11 a.m. and closes at 4 p.m.

Tickets for RAINBOWfest may be obtained directly from THE RAINBOW. We'll also send you a reservation form so you can get a special room rate.

The POSH way to go. You can have your travel arrangements and hotel reservations handled through RAINBOW affiliate, POSH Travel Assistance, Inc., of Louisville. For the same POSH treatment many of our exhibitors enjoy, call POSH at (502) 893-3311. All POSH services are available at no charge to RAINBOWfest attendees.

BE THERE!



SPECIAL EVENT!

COCO GALLERY LIVE

SHOWCASE YOUR BEST AT RAINBOWFEST

We are taking the popular "CoCo Gallery" on the road to RAINBOWfest Chicago — and we'd like you to submit your own graphics creations to be exhibited at the show!

RULES

- You can enter color or black-and-white photographs or printouts of your original artwork produced on the CoCo 1, 2 or 3. Entries should be framed, mounted or matted, and may not be smaller than 5-by-7 inches or larger than 11-by-14 inches.
- Don't send us anything owned by someone else; this means no game screens, digitized images from TV programs or material that's already been submitted elsewhere. A digitized copy of a picture that appears in a book or magazine is ***not*** an original work.
- Along with your entry, send a cover letter with your name, address and phone number, detailing how you created your picture (what programs you used, etc.). Please include a few facts about yourself, too!
- Your name, address and phone number, along with the title of your work, must be clearly marked on the back of each entry, and a disk copy of each piece must also be included.
- Entries may be mailed to THE RAINBOW before May 1, 1988, or brought to the RAINBOWfest registration booth by 10 a.m., Saturday, May 21.
- Your work will be returned if sent with a postage paid return envelope, or entries can be picked up at the close of the show — Sunday, May 22 at 4 p.m.

There will be two categories: one for graphics produced on the CoCo 1 and 2, and one for CoCo 3 graphics. Several awards will be made in each category. Winners will be determined by votes from RAINBOWfest attendees. In case of any ties, winners will be determined by our chief judge, CoCo Cat.

Prizes and ribbons will be presented Sunday, May 22, and winning entries will be published in the September '88 issue of THE RAINBOW. Send your entry to "CoCo Gallery Live," THE RAINBOW, 9509 U.S. Highway 42, Prospect, KY 40059.

YES, I'm coming to **Chicago!** I want to save by buying tickets now at the special advance sale price. Breakfast tickets require advance reservations.

Please send me:

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Circle one: Friday Saturday Sunday

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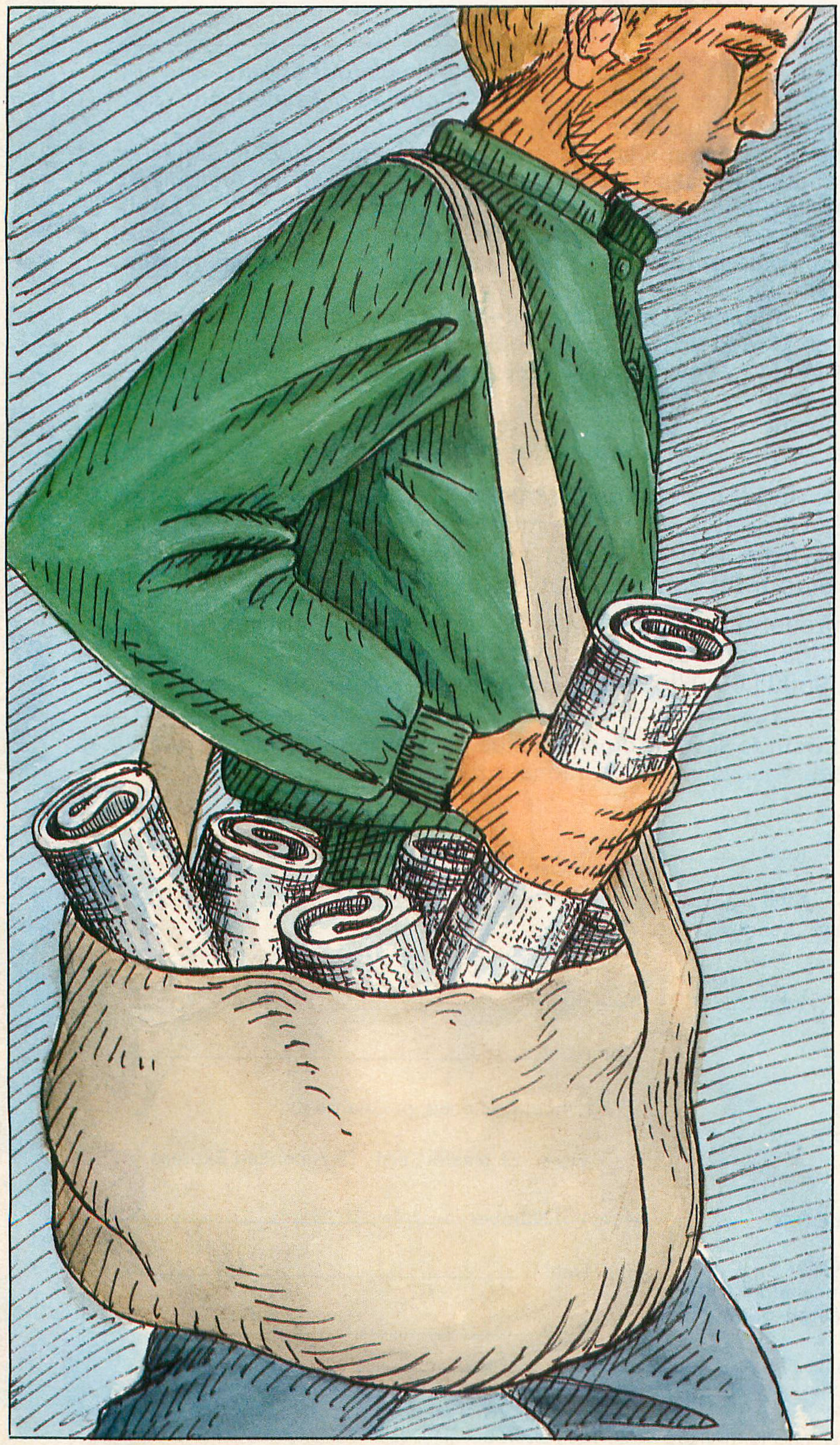
Signature ____

Advance ticket deadline: May 13, 1988. Orders received less than two weeks prior to show opening will be held for you at the door. Tickets will also be available at the door at a slightly higher price. Tickets will be mailed six weeks prior to show. Children 4 and under, free; over 4, full price.

Make checks payable to: The RAINBOW. Mail to: RAINBOWfest, The Falsoft Building, 9509 U.S. Highway 42, P.O. Box 385, Prospect, KY 40059. To make reservations by phone, in Kentucky call (502) 228-4492, or outside Kentucky call (800) 847-0309.

A bookkeeping system for newspaper carriers



Delivering the Goods

By Dale James Leistico

Responsibilities of having a paper route include collecting and submitting customer checks in addition to delivering the paper to customers' doorsteps before their morning coffee. My son has a paper route, and my daughter is soon going to follow in his footsteps. In fact, she has had substitute carrier jobs that required her to do collecting and bill paying.

To help with all this bookkeeping, I looked for a program that would do the job of listing out checks and figuring balances. I couldn't find what I wanted, but I remembered a program called *Refund-A-File* by Donald A. Turowski in the April 1986 RAINBOW. This program seemed like a good jumping-off point for the program I had in mind, what would become *Paper Route*.

Dale Leistico lives in Lompoc, California, and works in the aerospace industry. He uses his CoCo for help with home finances and word processing.

After examining *Refund-A-File*, I modified it to suit my purposes. I changed its sort routine to a partition sort. I deleted the "Replace Item" routine because I felt the "Add-Delete" routine would adequately take its place. Also, I changed the search routine to make it more versatile and incorporated a file check routine.

I included the ability to save the data to either tape or disk, with the data defaulting to the tape. This way users won't have to change anything when they upgrade to disk.

The program has the ability to check printer status and inform the user if the printer is not ready. And I added the feature of calling the directory from within the program.

Line 830 sets $99.99 as the upper limit of each customer check. The total amount of checks and bills is limited to $9,999.99 by lines 910 through 1010.

```
CARRIER ROUTE... 123
CARRIER NAME.... SARAH MILLS
  1  Allen Briggs     11.20
  2  Beth Herbert     15.75
  3  James Aubrey     11.20
  4  John Doe         15.75
  5  Mary Wilson      11.20
  6  Robert Jones     11.20
                   ========
CUST CHK TOT     $   76.30
COUPON           $    0.00
CASH             $    0.00
... SARAH MILLS  $    0.00
                   ========
TOTAL            $   76.30
```

Paper Route's operation needs little explanation as the program is menu-driven and prompts for information.

I believe *Paper Route* provides an excellent example of how a program can be customized to do another job. For example, with just a few more changes, my program would be useful to people who must submit a series of checks to pay their bills.

(Questions or comments about this program may be directed to the author at 313 Somerset Place, Lompoc, CA 93436. Please enclose an SASE when writing for a reply.) □

250	92	1430	50
440	76	1600	206
640	17	1770	119
820	91	1970	69
1050	13	END	23
1220	178		

The listing: PAPERS

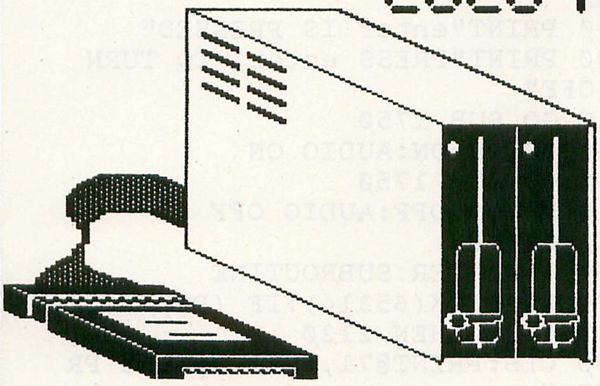
```
10 GOTO 2190
20 'MODIFIED FROM REFUND
30 'APRIL 1986 RAINBOW, PAGE 95
40 'BY DALE LEISTICO
50 '313 SOMERSET PLACE
60 'LOMPOC, CALIF,93436
70 CLEAR 3000:DIMS$(300),EX(300)
80 CLS(RND(8)):PRINT@32*6+10,"PA
PER ROUTE"
90 FOR Q=1TO1000:NEXT Q:CLS
100 GOSUB 1720
110 CLS
120 PRINT:PRINT"   ******select
choice******":PRINT
130 PRINT" (1)input checks to li
st"
140 PRINT" (2)add to the check l
ist"
150 PRINT" (3)delete checks from
 list"
160 PRINT" (4)print entire list"
170 PRINT" (5)save check list "
180 PRINT" (6)load check list "
190 PRINT" (7)alphabetize list"
200 PRINT" (8)search check list"
210 PRINT" (9)directory"
220 PRINT"(10)end session"
230 PRINTTAB(8);"SELECTION (1-10
)";
240 INPUT M
250 IF M<0 OR M>10 THEN 110
260 ON M GOSUB 290,410,510,700,1
070,1230,1380,1620,1760,1560
270 GOTO 110
280 ' ROUTINE TO INPUT/ADD ITEMS
290 IF Y=0 THEN 400
300 PRINT" do YOU wish TO erase
THE "
310 PRINT:PRINT " records IN THE
 computer ?"
320 LINEINPUT "<Y>ES OR <N>O..";
W$
330 IF W$="Y" THEN 370
340 IF W$="N" THEN RETURN
350 CLS:GOTO 300
360 FOR Q=1 TO 1000: NEXT Q:RETU
RN
370 CLS:PRINT@32*3+5,"OLD RECORD
S ERASED"
380 PRINT@32*6+5,"START NEW RECO
RD"
390 FOR Q=1 TO 1000:NEXT Q
400 Y=1
410 CLS:PRINT"input/add items ro
utine"
420 GOSUB 2170
430 PRINT:PRINT "CUSTOMER NAME"
Y;
```

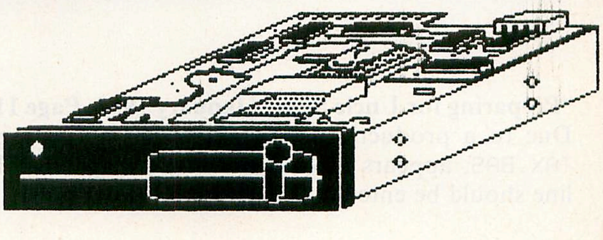
```
440 LINEINPUT S$(Y)
450 IF LEN(S$(Y))>15 THEN PRINT"
PLEASE RE-ENTER A SHORTER NAME":
GOTO 440
460 IF S$(Y)="" THEN RETURN
470 PRINT"CHECK AMOUNT $";:INPUT
 EX(Y)
480 Y=Y+1
490 GOTO 430
500 REM ROUTINE TO DELETE ITEMS
510 N=0
520 CLS:PRINT"delete items routi
ne"
530 GOSUB 2170
540 PRINT"NOTE-->delete from hig
hest":PRINT"         item number
 to ":PRINT"       lowest item n
umber!"
550 PRINT:INPUT "CUSTOMER NUMBER
 TO DELETE";N
560 IF N>Y-1 THEN 550
570 IF N=0 THEN RETURN
580 PRINT N;:PRINT"  ";:PRINTS$(
N);:PRINTEX(N)
590 PRINT"DO YOU WISH TO DELETE"
600 LINE INPUT "<Y>ES OR <N>O.."
;W$
610 IF W$="Y" THEN 620 ELSE 520
620 PRINT"  ITEM DELETED":GOSUB
360
630 FOR X=N TO Y-2
640 S$(X)=S$(X+1)
650 EX(X)=EX(X+1)
660 NEXT X
670 Y=Y-1
680 GOTO 510
690 REM ROUTINE TO PRINT ITEMS
700 EB=0:EC=0
710 CLS:PRINT"LIST ITEMS ON SCRE
EN(S) OR ON  PRINTER(P)":PRINT"
---ENTER 'S' OR 'P'..";:LINE INP
UT W$
720 IF W$="P" THEN D=-2:T=10:GOS
UB 2070:GOTO 750
730 IF W$="S" THEN D=0:T=0:GOTO
750
740 GOTO 710
750 CLS:PRINT" ENTER COUPON TOTA
L ":LINEINPUT CO$
760 PRINT" ENTER CASH TURN IN ":
LINEINPUT CA$
770 PRINT "ENTER YOUR BILL":LINE
INPUT EB$
780 CO=VAL(CO$):CA=VAL(CA$):EB=V
AL(EB$)
790 CLS
800 FOR X=1 TO Y-1 STEP 13
810 FOR Z=X TO X+12
820 IF D=-2 THEN PRINT@32*8," pr
inting---stand by!!!!!!!!!!!":IF
 S$(Z)="" THEN 860
```

```
830 PRINT#D,TAB(T):PRINT#D,USING
"###";Z;:PRINT#D,TAB(T+5)S$(Z);
840 PRINT#D,TAB(T+20):PRINT#D,US
ING "##.##";EX(Z)
850 EC=EC+EX(Z)
860 NEXT Z
870 IF D=0 GOSUB 1750
880 NEXT X
890 PRINT#D,TAB(T+17)"========"
900 PRINT#D,TAB(T)"CUST CHK TOT"
;
910 PRINT#D,TAB(T+17):PRINT #D,U
SING"$####.##";EC
920 PRINT#D,TAB(T)"COUPON";
930 PRINT#D,TAB(T+17):PRINT#D,US
ING"$####.##";CO
940 PRINT#D,TAB(T)"CASH";
950 PRINT#D,TAB(T+17):PRINT#D,US
ING"$####.##";CA
960 ET=EC+CO+CA
970 IF D=0 THEN NN$="YOUR CHECK"
980 PRINT#D,TAB(T)NN$;
990 PRINT#D,TAB(T+17):PRINT#D,US
ING"$####.##";EB-ET
1000 PRINT#D,TAB(T+17)"========"
1010 PRINT#D,TAB(T)"TOTAL";
1020 PRINT#D,TAB(T+17):PRINT#D,U
SING"$####.##";EB
1030 IF D=0 THEN GOSUB 1750
1040 RETURN
1050 REM ROUTINE TO SAVE ITEMS T
O DISK OR TAPE
1060 IF Y=0 THEN PRINT"NO RECORD
S IN FILE":FOR Q=1 TO 1000:NEXT
Q:RETURN
1070 GOSUB 1870
1080 CLS(8):PRINT@135,"save item
s on "GG$;
1090 SOUND 200,3:SOUND 200,3
1100 IF CC$="D" THENPRINT@32*8+8
,"insert data disk":SOUND 200,3:
1110 GOSUB 1750
1120 PRINT@161,"FILE NAME TO SAV
E..."
1130 LINEINPUT FF$
1140 IF CC$="T" THEN PRINT"PRESS
 play AND record" :GOSUB 1750
1150 CLS(0):PRINT@224,"saving" F
F$ " on "GG$"---stand by!";:SOUN
D 200,3
1160 PRINT FF$: PRINT HH
1170 OPEN "O",#HH,FF$
1180 FOR X=1 TO Y-1
1190 IF CC$="T" THEN PRINT#-1,S$
(X),EX(X) ELSE WRITE#1, S$(X),EX
(X)
1200 NEXT X
1210 CLOSE #HH:SOUND 200,3:RETUR
N
1220 REM ROUTINE TO LOAD FROM DI
SK OR TAPE
```

```
1230 GOSUB 1870
1240 CLS(4):PRINT@134,"load data
 from "GG$;:SOUND 200,3
1250 IF FF$="D" THEN PRINT@32*8+
8,"insert data disk!";
1260 IF FF$="T" THEN PRINT @32*5
+8,"press play on recorder";
1270 GOSUB 1750
1280 PRINT@161,"FILE NAME TO LOA
D..."
1290 LINEINPUT FF$
1300 CLS(0):PRINT@224,"loading "
FF$" from "GG$"-stand by";:SOUND
 200,3
1310 OPEN"I",#HH,FF$
1320 Y=1
1330 IF EOF(HH) THEN 1370
1340 INPUT #HH, S$(Y),EX(Y)
1350 Y=Y+1
1360 GOTO 1330
1370 CLOSE #HH:SOUND 200,3:RETUR
N
1380 REM ALPHABETIZE ROUTINE
1390 IF Y=0 THEN PRINT"NO record
s IN file":FOR Q=1 TO 1000:NEXT
Q:RETURN
1400 CLS(RND(8)):PRINT@32*8,"sta
nd by----alphabetizing list!"
1410 L=Y
1420 L=INT(L/2)+2
1430 FOR I=1 TO Y-L
1440 IF S$(I+L)="" THEN 1500
1450 IF S$(I)<S$(I+L)THEN 1490
1460 T$=S$(I):F=EX(I)
1470 S$(I)=S$(I+L):EX(I)=EX(I+L)
1480 S$(I+L)=T$:EX(I+L)=F
1490 NEXT I
1500 IF L=1 THEN 1540
1510 IF L>5 THEN 1420
1520 L=L-1:GOTO 1430
1530 GOTO 1420
1540 CLS(3):PRINT@32*8,"alphabet
izing completed!!!!!!!!":SOUND 2
00,3:FORQ=1TO500:NEXTQ:RETURN
1550 'END WARNING
1560 CLS:FOR B=1 TO 8:CLS(RND(8)
):SOUND 200,2:NEXT B
1570 PRINT@32*3,"before ending t
his session,":PRINT"be sure to s
ave all changes":PRINT"on your d
isk or tape file!!!":PRINT:PRINT
"if you are sure you want to":PR
INT"end the session, then press
'E'":PRINT"otherwise, press and
<enter> anyother";
1580 PRINT" key to return to the
 main menu"
1590 INPUT R$
```

COCO ACCESSORIES





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```
1600 IF R$="E" THEN CLS:END
1610 RETURN
1620 LINE INPUT"NAME TO SEARCH F
OR...";NN$
1630 CLS(5)
1640 FOR I=1 TO Y-1
1650 FT=INSTR(1,S$(I),NN$)
1660 IF FT>0 THEN PRINTS$(I);:PR
INT"    ";:PRINTUSING "###.##";EX
(I)
1670 IF FT>0 THEN GOSUB 1750
1680 NEXT I
1690 PRINT "END OF SEARCH"
1700 GOSUB 1750
1710 RETURN
1720 PRINT"THIS PROGRAM WILL KEE
P A FILE OFYOUR PAPER ROUTE CHEC
KS.":PRINT"YOU WILL HAVE ROOM FO
R ABOUT 150-300 ENTRIES(DEPENDIN
G ON THEIR LENGTH)!"
1730 PRINT"  THERE WILL ALSO BE
A PRINTER    OPTION FOR YOUR LIS
T WHEN YOU     WANT A HARD COPY.
"
1740 PRINT"note:  DO NOT USE COM
MAS WHEN      ENTERING ITEMS
!"
1750 PRINT@32*13+5,"PRESS enter
TO CONTINUE";:LINE INPUT R$:CLS:
RETURN
1760 IF PEEK(49152) = 68 THEN 18
00
1770 CLS: PRINT"THIS FEATURE IS
DISABLED FOR   NON DISK SYSTEMS
"
1780 GOSUB 1750
1790 RETURN
1800 CLS:DIR
1810 PRINT @((32*12)+25),"press"
1820 PRINT@((32*13)+23),"<ENTER>
"
1830 PRINT@((32*14)+28),"to"
1840 PRINT@((32*15)+22),"CONTINU
E"
1850 LINEINPUT R$:CLS:RETURN
1860 RETURN
1870 PRINT"SELECT <D>ISK OR <T>A
PE"
1880 LINEINPUT CC$
1890 IF PEEK(49152)=68 THEN 1910
1900 CC$="T"
1910 IF CC$="D" THEN GG$="disk":
HH=1:RETURN
1920 IF CC$="T" THEN 1940
1930 GOTO 1880
1940 GG$="tape":HH=-1
1950 CLS(RND(8))
1960 PRINT"SETUP TAPE AND RECORD
ER"
1970 PRINT"PRESS <play> ON THE R
ECORDER"
1980 PRINT"THE MOTOR WILL GO ON
WHEN"
1990 PRINT"enter IS PRESSED"
2000 PRINT"PRESS enter  TO TURN
IT OFF"
2010 GO SUB 1750
2020 MOTOR ON:AUDIO ON
2030 GO SUB 1750
2040 MOTOR OFF:AUDIO OFF
2050 RETURN
2060 'PRINTER SUBROUTINE
2070 PS=PEEK(65314):IF (PS)/2=IN
T((PS)/2) THEN 2120
2080 CLS:PRINT@71,"SET up the PR
INTER"
2090 SOUND 200,3
2100 GOSUB 1750
2110 GOTO 2070
2120 PRINT" ENTER CARRIER NUMBER
 ":INPUT MN
2130 PRINT" ENTER CARRIER NAME "
:LINEINPUT NN$
2140 PRINT#-2,TAB(10)"CARRIER RO
UTE..."MN
2150 PRINT#-2,TAB(10)"CARRIER NA
ME."NN$
2160 RETURN
2170 PRINT @34,"PRESS enter WHEN
 FINISHED"
2180 RETURN
2190 PCLEAR1:GOTO70
```

Corrections

"Preparing for Uncle Sam" (January 1988, Page 112): Due to a production error, Line 160 of Listing 1, TAX.BAS, appears incorrectly in the magazine. The line should be entered as it appears below.

```
160 DATA97,98,99,101,102,103,105
,109,111,113,117,119,120,121,123
,124,125,126
```

For quicker reference, Corrections will be posted on Delphi as soon as they are available in the Info on Rainbow topic area of the database. Just type DATA at the CoCo SIG> prompt and INFO at the TOPIC> prompt.

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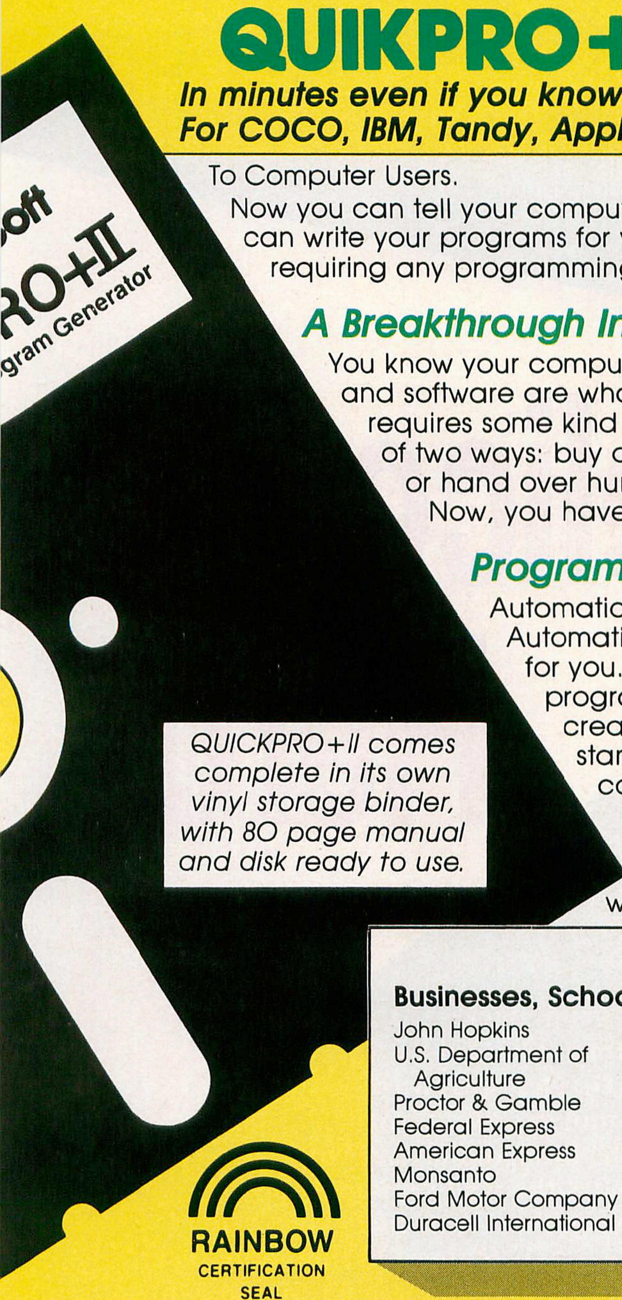

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Rescue miners from the volcanic caverns

Helicopter Hero

By Phil Holsten

Equipped with a heli-prop pack and a dynamite-shooting crash helmet, you hover into the volcanic caverns where several lost miners await rescue. You hear a cry behind a wall. Immediately you toss some dynamite, which explodes the wall on impact and reveals a lost man beyond the rubble. Your fuel gauge reads dangerously low. As you desperately attempt to find more fuel, you hear your engine sputter to a stop and you go spiraling down.

You are Helicopter Hero. Your mission is to fly through caverns rescuing as many men as possible while trying to save your own life. The walls neutralize your heli-prop packs on contact, and the rescue squad provided you with only three packs.

Running the Program

Helicopter Hero will run on all CoCos, requiring only 16K Extended Color BASIC and one joystick. Just load and run the program.

Phil Holsten is a senior at Modesto Christian High School, has programmed for the CoCos for six years, and is enjoying his CoCo 3. His other interests include mathematics, bicycling and racquetball.

After the title page, the program asks if you would like to enact a speed-up poke (located in Line 120). Then it asks for double or triple speed. Next, input the level desired (20 is the easiest and 2 is the hardest). A "score" screen is displayed while the cavern is constructed and includes the number of caverns you have been in, the level, the heroes left, shields left, men saved, men left behind and the percentage of men saved (if lower than 100 percent).

At the bottom of the game screen is a yellow fuel bar, which turns red as fuel is used up. When the yellow is gone, the game is over. If the yellow bar is not disappearing, you have more fuel than it can indicate.

Your hero is red and the miners (sitting) are green. The walls of the cavern are blue — do *not* touch them! On Level 20, there are no walls except for the edges of the screen. Level 20 is a wide-open area good for beginners to practice their flying. Every time a screen is cleared of lost men, the level goes down by an increment of two.

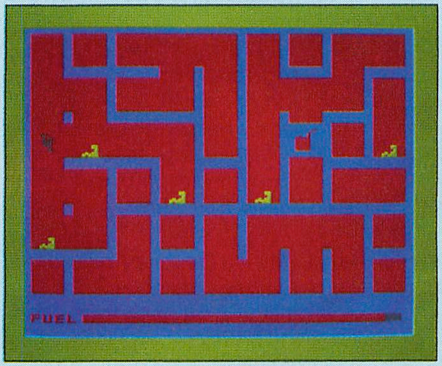
The game ends when you run out of fuel or heroes. The scoring screen shows you the final results and asks if you would like another game. By answering "no" (pressing N), a slow-down poke is executed and the game ends (Line 840).

Controls

The keyboard is used to move your hero throughout the caverns. The right and left arrows move you to the sides and the space bar moves you up. You will go down if no buttons are pressed. You may hold a direction button down instead of tapping it over and over, thanks to the peeks and pokes in lines 430 through 450.

The @ key fires a bomb from your helmet. It will blow up when it hits anything blue (the walls). All miners are reconstructed after every fourth shot (just in case there are some wise guys out there who decide to blow up the walls directly below one of the miners to destroy him). If you have no intention of going on a bombing spree, you may delete the end of Line 370 after the GOSUB statement and delete lines 730 through 750.

The right joystick (preferably self-centering with x-axis "free") controls the prop pitch of your rotor blades. Moving the stick all the way to the left gives you no pitch, and, therefore, won't allow you to move in any direction; however, you may use the arrow keys to turn around in place.



As you move the stick to the right, your hero moves faster in all directions. Using a high prop pitch is dangerous when moving from side to side, but it is ideal for going up or down quickly. The lower pitches are valuable for the tedious movement required in rescuing the miners.

The right joystick also controls your shields. By moving it up all the way (be sure to center it after you hear the tone), your shield is turned on. A blue circle surrounds you for less than 10 seconds, and this shield will "eat" away anything it comes in contact with. You are given only one shield at the start of the game.

Shields serve no useful purpose except that on Level 2 they are a precaution against killing yourself trying to get through a horizontal wall extending clear across the screen (there would be no way to blast through it with dynamite). The shield's only other use is for getting through walls quickly when fuel is low.

Here is a tip for arranging your fingers on the keyboard: Use your right hand for the buttons. Place your index finger on the @ key and your

Table 1

Line	Description
Initialization	
20-70	Title page
80-140	Ask for speed-up poke and get level
150	Defines variables and strings
160	GOSUBs scoring screen
170-230	Define variables; construct game screen
240	Draws "Fuel"; check joystick for warning message
250-310	Place miners; place fuel tank (if GS=1)
320	Shows game screen
Main Loop	
330	Draws hero
340-350	Maintain fuel bar; check amount left
360	Erases variables = draw variables
370	Checks for throwing dynamite
380-410	Check for shield switch on
420	Gets prop pitch from JOYSTK reading
430-460	Check buttons, PPOINTs around hero, number of men rescued
Subroutines	
480-530	Check PPOINTs around hero when falling
540-560	Which man was rescued?
570-620	Firing bomb right; check for wall, fuel, or miner
630-670	Firing bomb left; check for wall, fuel, or miner
680	Explosion
690-720	Get more fuel; check for extra shield; update fuel bar
730-750	Redraw miners in case destroyed
850-860	Score screen
Loss of a Hero	
760-770	Kill hero; check number killed
780-810	Out of gas, falls, and dies
820-840	Game Over displayed; ask for another game

Table 2

Variable	Description
A	Horizontal screen location
B	Vertical screen location
P	Right/left `DRAW` string for hero
C, D, Q	Erase hero
A, B, P	
E	Horizontal position of bomb
F	Vertical position of bomb
G, H	Erase bomb
E, F	
I	Men left behind
J	Total men rescued
K	Men rescued on the screen
L	Lost men on the screen
M	Horizontal position of fuel tank
N	Vertical position of fuel tank
O	Prop pitch (`JOYSTK(0)/4`)
R	Heroes left
S	Fuel left
T	Shields left
V, W, X Y, Z	Miscellaneous (`FOR-NEXT`)

Variable	Description
CV	Caverns been in
GS	Gas tank on-off switch
LL	Level number
PP	Shot count (resets at 4)
TT	Shield on-off switch

String	Description
A$, B$	Miscellaneous (title page)
I$	Speed-up poke? double or triple?
J$	Play again?
P$(1), P$(2)	Draw hero right or left
R$	Draw miner sitting
S$	Draw fuel can

Array P(x,y)	(Miner Description)
x	Column number
y	1 P(x,y) = Horizontal position (`P(x,y)`)
y	2 P(x,y) = Vertical position (`P(x,y)`)
y	0 P(x,y) = 0 if not there (`P(x,y)`) or = 1 if not rescued (`P(x,y)`)

thumb on the space bar. Your other two "big" fingers should fall nicely on the right and left arrow keys. Your left hand is free to use the joystick.

Fueling Up

Several times during the game, you will get low on fuel and will need to find some more. Fuel is represented by a yellow gas can on a blue background. To get at it, simply shoot it and your reserves will increase by a random amount. Sometimes a new shield is awarded when you pick up fuel; this is signaled by a siren.

Rescuing Miners

To rescue a miner, simply float down slowly and touch your toe (toe, not heel) to him. This is the only point on your heli-suit that checks for green contact. When all men on the screen are rescued, the score screen is shown while another cavern is constructed. If you need fuel before going on to the next level, get it *before* you rescue the last man!

How It's Animated

Helicopter Hero uses a technique of animation that is not very popular, but is very effective. The old `GET` and `PUT` "box" method simply will not do here. We need something that doesn't have a "cushion" around it.

The `DRAW` statement works fine when we define a string for the hero. Look at Line 330. The symbols within the quotes (`=C;` and `=D;`) are used in the place of numbers. You may put a variable in the place of any number within a `DRAW` string or a `PLAY` string, just so long as an equal sign precedes and a semicolon follows. However, something like `=V+2;` will not work. Instead, let `W=V+2` and then put the variable `W` in the string.

The `DRAW` statements in Line 330 contain two sets of variables: `A`, `B`, `P` and `C`, `D`, `Q`. The first set draws the man and the second set erases the man. As the program goes through the main loop, `A`, `B` and `P` change, but `C`, `D` and `Q` still retain the values they were assigned in Line 360. This way, the "old" man is erased, and an instant later the "new" one is drawn. This prevents the flashing effect that would occur if it were done the other way around.

Modifications

Those of you who own a CoCo 3 and would like to be warned when fuel is getting low, insert `PALETTE3,7` in lines 130 and 710, and enter this line:

```
355 IF S>170 THEN PALETTE 3,
RND(63)
```

If you would like the game to run a little faster and don't mind giving up your shields, delete the following: Line 700, the `T=1:` in Line 150, and lines 380 through 410. In Line 850, change the `196` to `228` and delete `PRINT@260, "SHIELDS LEFT ";T;:`.

(Questions or comments about this program may be directed to the author at 908 Peachwood Court, Modesto, CA 95350. Please enclose an SASE when writing for a reply.) ☐

90	100	640	244
200	181	720	181
340	161	END	181
450	175		

The listing: `HELIHERO`

```
10 'Helicopter Hero  (C) 1985
 Phil Holsten  908 Peachwood Ct
 Modesto, CA   95350
20 DATA66,10,102,2,134,2,138,4,1
66,2,170,2,198,8,230,6,262,6,296
,4,330,2,362,2,394,4
30 PLAY"V20O1L255T255":CLS2:FORX
=1TO32:A$=A$+CHR$(159):B$=B$+CHR
$(143):NEXT:PRINT@480,B$;:PRINT@
448,A$;:PRINT@491,"^ OUR HERO ^"
;:FORX=1TO13:READ Y,Z:FORW=1TO Z
:PLAY"P5C":PRINT@Y+W,CHR$(191);:
NEXTW,X
40 A$(1)="HELICOPTER HERO":A$(2)
="BY PHIL HOLSTEN":A$(3)="COPYRI
GHT  1985":W=176
```

```
50 FORX=1TO3:FORY=173TO191:PLAY"
C":PRINT@Z,CHR$(159);:PRINT@Y,CH
R$(191);
60 IF Y>176THENPRINT@Z,MID$(A$(X
),Y-176,1);
70 Z=Y:NEXTY:PRINT@191,CHR$(159)
;:FORV=1TO700:NEXTV:FORY=173TO19
1:PLAY"A":PRINT@Z,CHR$(159);:PRI
NT@Y,CHR$(191);:Z=Y:NEXTY:PRINT@
191,CHR$(159);:FORV=1TO400:NEXTV
,X:FORX=31TO1STEP-2:PLAY"P20;1":
PRINT@480,A$;:PLAY"V=X;2":NEXT
80 CLS3
90 PRINT@199,"SPEED UP POKE (Y/N
)";:I$=INKEY$:IF I$=""THEN90
100 IF I$<>"Y"THEN130
110 PRINT@293,"DOUBLE OR TRIPLE
 (2/3)";:I$=INKEY$:IF I$=""THEN1
10
120 IF I$="3"THENPOKE65497,0ELSE
POKE65495,0
130 PRINT@361,;:INPUT"LEVEL (2-2
0)";LL:IF LL>20THEN LL=20
140 IF LL<2THEN LL=2
150 S=0:T=1:CV=1:R=0:I=0:J=0:PLA
Y"O1T255V20L255":P$(1)="R2D3NR2U
8NR2D2NR2L2D2L2U6NL2NR2":P$(2)="
L2D3NL2U8NL2D2NL2R2D2R2U6NL2NR2"
:R$="R4U6L2D1BD3D1L4NU1L2D1":S$=
"D1L2D7R2U7R2D7R2U7R2ND7U3R1E1R1
E1"
160 GOSUB850
170 PMODE3,1:PCLS3:K=0:A=14:B=18
:P=1:C=A:D=B
180 COLOR2,3:IF LL=20THEN LINE(4
,4)-(248,164),PSET,BF:GOTO230ELS
E FORY=4TO160STEP28:FORX=4TO236S
TEP28:LINE(X,Y)-(X+20,Y+20),PSET
,BF:NEXTX,Y:FORY=25TO160STEP28:F
ORX=4TO236STEP28:IFRND(LL)=1THEN
200
190 LINE(X,Y)-(X+20,Y+8),PSET,BF
200 NEXTX,Y:FORX=26TO236STEP28:F
ORY=4TO160STEP28:IFRND(LL)=1THEN
220
210 LINE(X,Y)-(X+8,Y+20),PSET,BF
220 NEXTY,X
230 LINE(38,178)-(246,182),PSET,
BF:IF S>0THEN COLOR4,3:LINE(244-
S,178)-(248,182),PSET,BF
240 DRAW"C2BM4,182U2NR4U2R4BR4D4
R4U4BR4NR4D2NR4D2R4BR4NR4U4":IF
JOYSTK(0)>5THEN PRINT@227,"move
joystick to the left";
250 L=9:FORX=14TO238STEP28:Z=((X
-14)/28)+1:IFRND(3)=1THEN P(Z,0)
=0:L=L-1:GOTO290
260 Y=(RND(6)*28)-4:DRAW"C1BM=X;
,=Y;"+R$
270 IFPPOINT(X,Y+1)=2THENDRAW"C2
BM=X;,=Y;"+R$:Y=Y+2:DRAW"C1BM=X;
,=Y;"+R$:GOTO270
280 P(Z,1)=X:P(Z,2)=Y:P(Z,0)=1
290 NEXTX:IFRND(3)=1THENGS=0:GOT
O320
300 GS=1:M=(RND(7)+1)*28+4:N=(RN
D(4)+1)*28+4:IFPPOINT(M+6,N+20)=
1THEN300
310 COLOR3,3:LINE(M,N)-(M+20,N+2
0),PSET,BF:X=M+6:Y=N+8:DRAW"C2BM
=X;,=Y;"+S$
320 SCREEN1,0
330 DRAW"C2BM=C;,=D;"+P$(Q):DRAW
"C4BM=A;,=B;"+P$(P)
340 S=S+.2:IF S>0THENLINE(248-S,
178)-(248-S,182),PSET
350 IF S>209THEN780
360 C=A:D=B:Q=P:PLAY"V8;1"
370 IFINKEY$="@"THENONP GOSUB570
,630:PP=PP+1:IF PP=4THEN PP=0:GO
SUB730
380 IFJOYSTK(1)=0THEN T=T-1:IF T
<0THEN T=0:GOTO420ELSESOUND150,4
:TIMER=0:TT=1
390 IF TT=0THEN420
400 IFB>154ORB<14ORA<12ORA>238OR
TT=1ANDTIMER>500THENTT=0:GOTO420
410 PLAY"O4V25;12":CIRCLE(A,B-3)
```

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```
,10,3:CIRCLE(A,B-3),10,2:CIRCLE(
A,B-2),10,2:PLAY"O1V10"
420 O=INT(JOYSTK(0)/14)
430 IFPEEK(343)=247THENIFPPOINT(
A-6,B+3)=3ORPPOINT(A-6,B-5)=3ORP
POINT(A-2,B-7)=3THENP=2:GOTO760E
LSEPOKE343,255:A=A-O*2:P=2:GOTO4
50
440 IFPEEK(344)=247THENIFPPOINT(
A+6,B+3)=3ORPPOINT(A+6,B-5)=3ORP
POINT(A+2,B-7)=3THENP=1:GOTO760E
LSEPOKE344,255:A=A+O*2:P=1:GOTO4
50
450 IFPEEK(345)=247THENIFPPOINT(
A-4,B-8)=3ORPPOINT(A+4,B-8)=3THE
N760ELSEPOKE345,255:B=B-O:GOTO47
0
460 ONP GOSUB480,510:B=B+O:IF K=
L THEN CV=CV+1:LL=LL-2:IF LL<2TH
EN LL=2:GOTO160:ELSE160
470 GOTO330
480 IFPPOINT(A+4,B+4)=3ORPPOINT(
A-2,B+1)=3ORPPOINT(A-4,B-6)=3THE
N760
490 IFPPOINT(A+4,B+4)=1THEN540
500 RETURN
510 IFPPOINT(A-4,B+4)=3ORPPOINT(
A+2,B+1)=3ORPPOINT(A+4,B-6)=3THE
N760
520 IFPPOINT(A-4,B+4)=1THEN540
530 RETURN
540 FORX=1TO9:IF P(X,0)=0THEN560
550 IF ABS(P(X,1)-A)<=14AND ABS(
P(X,2)-B)<=14THEN P(X,0)=0:J=J+1
:K=K+1:SOUND200,1:DRAW"C2BM=P(X,
1);,=P(X,2);"+R$:X=9
560 NEXTX:RETURN
570 E=A+4:F=B-4
580 PSET(G,H,2):PSET(E,F,4):G=E:
H=F
590 E=E+2:IFPPOINT(E+2,F)<>2THEN
600ELSE580
600 IF PPOINT(E+2,F)<>3OR E>244T
HEN PSET(G,H,2):RETURN
610 IF GS=1AND E<M+26AND E>M-4AN
D F>N-1AND F<N+21THEN690
620 GOTO680
630 E=A-4:F=B-4
640 PSET(G,H,2):PSET(E,F,4):G=E:
H=F
650 E=E-2:IFPPOINT(E-2,F)<>2THEN
660ELSE640
660 IF PPOINT(E-2,F)<>3OR E<16TH
ENPSET(G,H,2):RETURN
670 IF GS=1AND E>M-4AND E<M+26AN
D F>N-1AND F<N+21THEN690
```

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One-Liner Contest Winner . . .

Use your right joystick to draw with the "rubber band" approach. When you have positioned a line where you want it, press the joystick button to set it. The next line rotates around the previous line's endpoint. Pressing any key will skip to the current joystick location without drawing the line.

The listing:

```
0 PMODE1,3:PCLS:PMODE1,1:SCREEN1
:H=128:V=96:FORJ=0TO1STEP0:X=JOY
STK(0)*4:Y=JOYSTK(1)*3:LINE(H,V)
-(X,Y),PSET:A$=INKEY$:IFA$>""THE
NPCOPY3TO1:PCOPY4TO2:H=X:V=Y:NEX
TELSEIF(PEEK(65280)AND1)THENPCOP
Y3TO1:PCOPY4TO2:NEXTELSEPCOPY1TO
3:PCOPY2TO4:H=X:V=Y:NEXT
```

Gary Haussman
Loveland, CO

(For this winning one-liner contest entry, the author has been sent copies of both *The Third Rainbow Book of Adventures* and its companion *The Third Rainbow Adventures Tape.*)

```
680 FORX=1TO11STEP2:CIRCLE(E,F),
X,4:PLAY"V25;=X;":NEXTX:FORX=1TO
11STEP2:CIRCLE(E,F),X,2:NEXTX:FO
RX=0TO2STEP2:LINE(X,X/2)-(250+X,
167+X/2),PRESET,B:NEXT:RETURN
690 PSET(G,H,2):GS=0:X=M+10:Y=N+
10:COLOR4,3:PLAY"V15":FORZ=0TO10
STEP2:LINE(X-Z,Y-Z)-(X+Z,Y+Z),PS
ET,B:PLAY"V-EEFFFFGGGG":NEXT:COL
OR2,3:FORZ=0TO10STEP1:LINE(X-Z,Y
-Z)-(X+Z,Y+Z),PSET,B:NEXT
700 IF RND(5)=3THEN T=T+1:FORX=1
TO5:PLAY"O5L100;1;2;3;4;5;6;5;4;
3;2;":NEXT:PLAY"O1L255"
710 S=S-50-(RND(25)*2):IF S<0THE
NLINE(38,178)-(246,182),PSET,BF:
RETURN
720 LINE(38,178)-(248-S,182),PSE
T,BF:RETURN
730 FORZ=1TO9:IF P(Z,0)=0THEN750
740 X=P(Z,1):Y=P(Z,2):DRAW"C1BM=
X;,=Y;"+R$
750 NEXTZ:RETURN
760 DRAW"C2BM=C;,=D;"+P$(Q):DRAW
"C4BM=A;,=B;"+P$(P):PLAY"V25":R=
R+1:I=I+(L-K):FORX=11TO1STEP-2
770 PLAY"V-;9;8;7;6;":CIRCLE(A,B
-2),X,2:PLAY"4;3;2;1;":NEXTX:IF
R=3THEN820ELSE CV=CV+1:GOTO160
780 PLAY"V31":I=I+(L-K)
790 DRAW"C2BM=A;,=D;"+P$(Q):DRAW
"C4BM=A;,=B;"+P$(P):Q=P:D=B:B=B+
BB:BB=BB+.5:IF RND(2)=1THEN P=3-
P
800 PLAY"V-DC":IF B>170THEN B=B-
BB:GOTO810ELSE790
810 PLAY"V31O1":FORX=1TO40:PSET(
RND(7)*2+A-8,RND(15)+B-10,RND(2)
):PLAY"CC":NEXT:FORX=1TO500:NEXT
820 CLSRND(9)-1:FORX=1TO20:PLAY"
V31O5L255;1;2;4;3;5":PRINT@RND(4
00)," GAME OVER ";:NEXTX
830 GOSUB850:PRINT@484,;:INPUT"a
nother mission (Y/N)";J$
840 IF J$="Y"THEN CLS3:GOTO130EL
SE CLS:IF I$="3"THEN POKE65496,0
:END ELSE POKE65494,0:END
850 CLS4:PRINT@68,"CAVERNS  ";CV
;:PRINT@100,"LEVEL  ";LL;:PRINT@
196,"HEROES LEFT  ";3-R;:PRINT@2
60,"SHIELDS LEFT  ";T;:PRINT@356
,"MEN SAVED  ";J;:PRINT@388,"MEN
 LEFT BEHIND  ";I;:IF I>0THENPRI
NT@420,"SAVE %  ";INT((J/(J+I))*
100);
860 RETURN
```

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The Care and Handling of Tapes and Disks

By Ed Ellers
Rainbow Technical Editor

In response to Page R. Edmonson's request for information on the care and handling of floppy disks ("Letters to the Rainbow," December 1987, Page 7). . .

Cassettes

Should I use those special "computer cassettes," or are normal audio cassettes OK? What kind of tapes should I use?

Any standard audio cassette (often called "normal bias" or "Type I") will work, although it's best to use one of the better quality tapes on the market. Since the CoCo writes and reads data as an audio signal, the requirements are the same as for audio recording.

The one thing you want to look for is a tape that has as few surface imperfections as possible, to avoid losing data due to "dropouts." If in doubt, try recording some music on the tape you're considering, using the best recorder you have, and listen for dropouts in one or both channels; if you don't hear any, and the sound is reasonably clear (not muffled or "hissy"), the tape should be suitable for computer use.

The special "computer cassettes" sold by Radio Shack and other dealers actually use just a high-quality audio tape. The major advantage of these cassettes is their length — typically five, 10 or 20 minutes long. Some computer cassettes are supplied without leaders at the ends so that you can start recording on the beginning of the tape without having to wind past the leader. (Actually, it's a good idea to skip the first few seconds of the tape, anyway — that's the area most likely to be damaged, whether the cassette has a leader or not.) Any length up to 60 minutes will do, although you should avoid the C-90, C-120 and C-180 cassettes because they consist of thinner tape that may be less reliable.

There's another type of computer cassette you may come across, one that has a large notch in the housing between the two record-protect tabs. These data cassettes are designed for some "streamer" backup systems (as well as some older computers and terminals), and are not suitable for use with the CoCo. Also, avoid the "high bias" or metal-particle tapes; these won't be any better than a good normal bias tape, and may not work properly in your recorder.

What's the proper way to store cassettes?

Cassettes should be stored at room temperature, in their cases (if you have them). You might want to buy empty cases for the tapes that don't have them, but it's not mandatory. Contrary to popular belief, audio cassettes won't be damaged by being stacked horizontally. Also, rewind the tape to the beginning (either side will do) before putting it away. If you can see that the tape was wound unevenly, run it all the way to one end and then back to the other; this will pack the tape on the reel properly and prevent the tape from becoming creased.

What volume setting should I use?

The correct volume setting will depend on the recording level of the tape you're trying to load. We've found that a setting between 2 and 3 works best on the Radio Shack CTR-80 and CCR-81. On other recorders you'll have to find it by trial and error; one way to start is to type `AUDIOON:MOTORON`, press ENTER, and then play a tape through the CoCo. Adjust the volume to the highest point before the signal starts to become distorted, then try a `CLOAD` at that setting; if you still can't get tapes to load, start turning the volume *down* until you get good results.

What about head alignment?

It's very common for a recording head to be misaligned with respect to

---

Ed Ellers, a RAINBOW and PCM staff member, is a self-confessed electronics fanatic who takes time off to pursue other interests, including science fiction.

the tape, and far too often the head gap in your recorder may not match the tracks recorded by another machine. This causes the playback to be somewhat muffled, with the high end rolled off, resulting in a large number of errors when you try to load the file into your CoCo. (Head alignment errors are so common that some of the better stereo cassette decks have a "tracking" control to match the alignment of any tape you play.)

If you need to adjust the head in your recorder, enter the `AUDIOON:MOTORON` command and play the tape you need to match, then insert a small Phillips screwdriver through the tiny hole in the nameplate until it reaches the alignment screw. Turn the screw one way or the other to get the clearest signal.

When you've finished loading a balky tape this way, you'll need to reset your recorder using a cassette you've recorded on previously. A special alignment cassette would be even better, if you're able to find one.

How do I clean the heads on my recorder?

The best way to clean the heads is with a cotton swab dipped in alcohol or a special head-cleaning solution. Simply soak the swab and gently rub it over the heads to remove any oxide or other stains. (I don't recommend using a head-cleaning cassette; although some are OK, others can do more harm than good.)

What about demagnetizing the heads?

Believe it or not, some authorities say that it's not necessary to demagnetize, or degauss, recording heads — they say that the "bias" signal fed through the head during recording removes any residual magnetic field. Other experts aren't so sure. In any case, it does no harm to demagnetize the recording head, using a demagnetizing "wand" such as Radio Shack's 44-225 or 44-207. If you have a recorder other than one of the Radio Shack computer cassette recorders, check to make sure that the erase head moves back and forth when the Play button is pressed. If it only moves forward for recording, keep the demagnetizer away from it — it's probably a permanent-magnet head, and if you demagnetize it your recorder won't erase properly!

What about bulk tape erasers?

Bulk erasers are mainly intended to be used when you have to erase an entire tape or disk. It's often said that a bulk eraser will erase a tape more completely than the erase head on the recorder, but this isn't necessarily the case.

If you decide to use a bulk eraser, remember to keep it well away from any other tapes or disks, possibly in another room.

Can my tapes be damaged by X-rays or magnetic fields in transit?

Recordings can indeed be damaged by stray magnetic fields, not only in the mail but around your home or office, from things like hi-fi speakers or large electric motors. If you're mailing tapes or disks, it's a good idea to label the package, warning postal officials to watch out for magnets.

As for X-rays, I'm told that they do *not* erase tapes or disks, but that many X-ray machines generate strong magnetic fields in operation and will therefore erase magnetic recordings that are passed through them.

Disks

What's the real difference between single-sided and double-sided disks?

It's true that "single-sided" diskettes do have a magnetic coating on both sides and are actually identical to the same maker's "double-sided" disks. The difference is that disks sold as "double-sided" are tested for errors on both sides, while single-sided disks are tested only on the first side. The single-sided disks could be disks that passed on Side A but had one or more errors on Side B. More likely, they are disks that were left over after the needed number of double-sided disks were selected from a batch. In this case, the "other" side will not have been tested, and may or may not be in good shape. Nobody will break down your door to bust you for using the second side of a single-sided disk — in fact, a lot of people do use both sides — but it's at your own risk, and you may get more errors than you bargained for.

What type of disks should I buy?

If anything, this question is even more hotly debated in the case of disks than it is for cassettes. Some users say you should buy the best disks you can afford; others say that the cheapest disks around are just fine. Actually, since disks are one of the few products that are either "good" or "bad," you will probably do well with any disks sold by a reputable company that is willing to replace any disks that are defective — which would include any disk that has one or more bad tracks when formatted for the first time. Warranties do vary, all the way from covering just the first use of the disk to a full, lifetime warranty.

Polaroid has a rather unusual warranty on its Professional disks, which have gray jackets. These not only have a full, lifetime warranty, but if one of these disks is damaged they will copy its data to a new disk for you at no charge — you just ship the disk to Polaroid and they return the new disk the same way you sent the old one. The Professional disks may be worth considering for your most important programs and data files.

How should disks be stored?

Disks should be stored at room temperature and away from dust and dirt, preferably in the boxes (if any) they came in. As with cassettes, it doesn't matter if the disks are stored vertically or horizontally. It is important to keep them away from heat or magnetic fields, and to place them so that they won't be bent. Above all, keep the disks out of the sun — they warp very quickly.

How do I clean the disk drive head?

Disk drive heads are very difficult to reach, even if you take the cover off the drive, so the best way to clean them is with a wet-type head-cleaning disk, such as Radio Shack's 26-408. The "dry system" cleaning disks can easily damage a head and are definitely not recommended.

Are bulk erasers useful for disks?

Unlike tape recorders, disk drives do not have a separate erase head; instead, the read/write head simply writes over the old data. Since the "modified FM" system always records at full strength, this normally completely replaces the previous data. But in some situations you may want to erase the whole disk before saving an important file. This may also be true if you're sending a disk to someone to ensure they get only the files you want them to have. As with cassettes, do your bulk erasing well away from any other tapes or disks.

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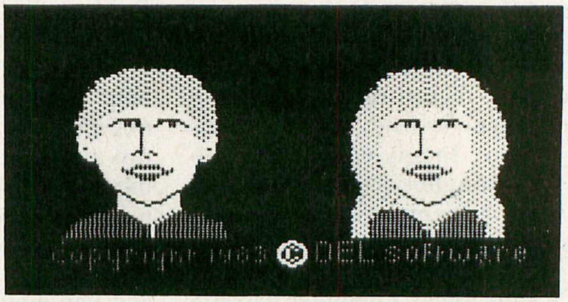

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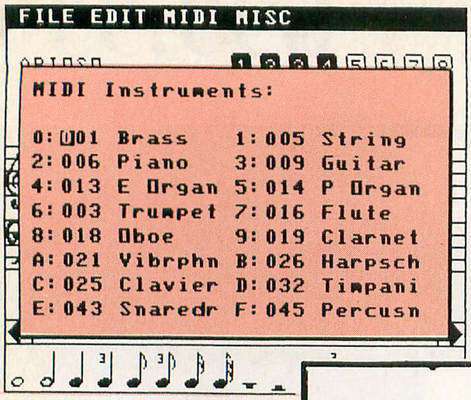

```
MIDI Instruments:

0:001 Brass     1:005 String
2:006 Piano     3:009 Guitar
4:013 E Organ   5:014 P Organ
6:003 Trumpet   7:016 Flute
8:018 Oboe      9:019 Clarnet
A:021 Vibrphn   B:026 Harpsch
C:025 Clavier   D:032 Timpani
E:043 Snaredr   F:045 Percusn
```

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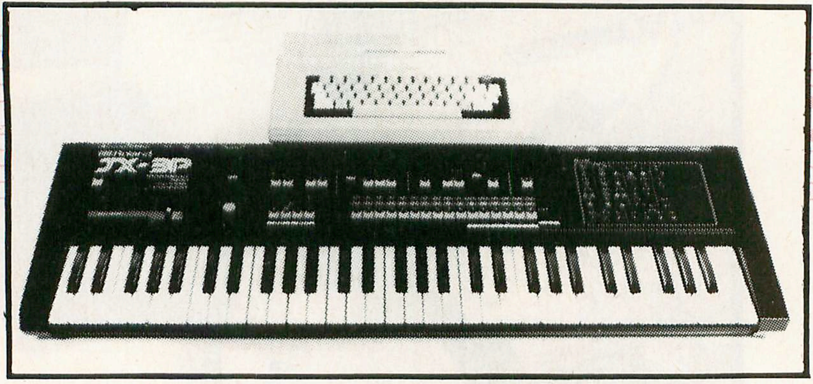

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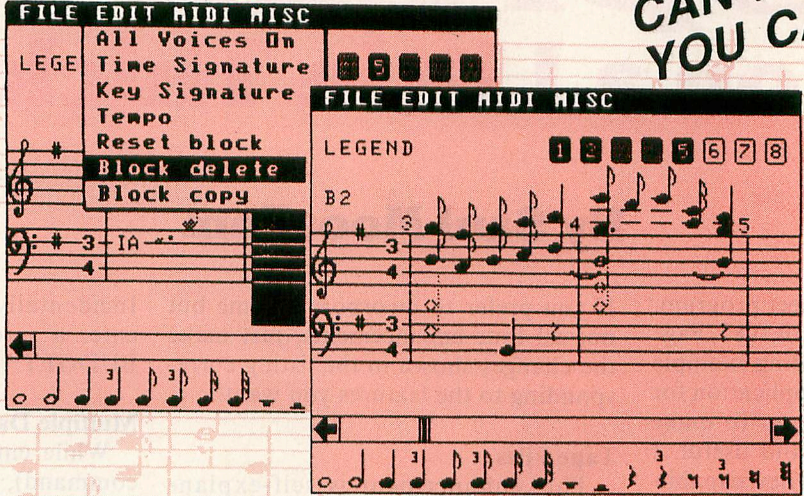

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Enhancements to Cheap Spread

'Spread'ing It on a Little Thicker

By Saul Mooallem

Bill Reed's spreadsheet program, *Cheap Spread* [April 1987, Page 174], is an outstanding example of a practical and useful application for a wide range of CoCo users. To make it even more convenient and useful, I have added four important new capabilities:

1) a capacity allowing spreadsheets to be saved to or loaded from tape (for those of us with lower budgets who really need spreadsheets);
2) optional row and column headings, which are handy for large or complex spreadsheets (this feature can be used to "lock in" headings on the screen, avoiding the need to move the display window back and forth);
3) use of the right and down arrow keys for successive data entry into multiple cells (you no longer need to repeatedly use the `DAT` command — just move to the next cell);
4) alphanumeric cell labels, which speed up typing and improve readability, especially in functions (brackets are completely eliminated; for instance, the function [5,3]+[5,4]/[5,5] becomes simply E3+E4/E5).

Due to the modularity of the program, I was able to implement these features independently of one another. If you prefer to incorporate some but not all four enhancements, just make the changes shown in the listing corresponding to the features you want.

Saul Mooallem is a sales representative for a major computer company. He holds a master's degree in computer science and has extensive experience in software development.

Tape Files

This enhancement is self-explanatory. Of course you are not asked if you want to replace an existing spreadsheet or save a new one, as you are asked when using disk files.

Headings

The first row and the first column are considered the headings. A new `HDG` command allows you to turn the display of headings on or off. Headings are initially off, and the program functions exactly as before. However, after you turn them on by typing `HDG`, they appear as the first column and top row of the portion of the spreadsheet displayed on the screen. To turn off headings, just type `HDG` again.

When headings are displayed, there is one less column and row available for actual data, but this is often a small inconvenience compared to moving the window back to check headings. Note that when headings are turned on:

- the first row and column do not have labels in the margins. This is how you can tell whether you have turned the headings on or off.
- row and column numbers in the `J` (jump) command refer to the upper-left cell of the desired display *not* including headings.
- you are not able to enter or change headings without first turning them off.
- the operation of the `P` (print) command is not affected.

Incidentally, I find it convenient to enter a spreadsheet title such as "87 BUDGET" in Cell [1,1].

Multiple Data Entry

While entering data (using the `DAT` command), you can move between cells using the right arrow or down arrow keys. This speeds up data entry substantially by allowing you to fill in an entire column of data by entering `DAT` only once. The left arrow key backspaces as before.

Alphanumeric Cell Names

Rows are now designated by the letters A through Z, so the comma between row and column are eliminated. For instance, the command `F3,2` is now entered as `F C2`, and `CR2-5` (copy row) becomes `CR B-E`.

The best improvement is that brackets are no longer needed in functions. However, there are two kinds of limitations imposed by this feature: Command names may not contain spaces, and a space must appear between the command name and the cell name. Also, you are limited to 26 rows.

Correction

The original *Cheap Spread* yields a BS Error in Line 16550 when the user jumps to a nonexistent cell with the `J` command and then tries to verify formulas with "VF." To correct this, alter Line 16540 as shown:

```
16540 IF (I+DR-1>MR) OR (J+
DC-1>MC) THEN 16580
```

Editor's Note: The altered program will replace the four listings below on this month's RAINBOW ON DISK *and* RAINBOW ON TAPE. *It will be saved under the filename* SPREAD2.

Listing 1: TAPE

```
0 REM changes for tape save/load
7020 REM delete line 7020
7030 OPEN"I",#-1,F$
7040 INPUT#-1,MR,MC
7080 INPUT#-1,C$(I,J)
7120 INPUT#-1,FC$(I,J)
7140 CLOSE#-1
7510 REM delete line 7510
7520 PRINT@32,STRING$(30,32);:PR
INT@32,"";:INPUT"FILENAME: ";F$
7530 REM delete line 7530
7540 REM delete line 7540
7550 OPEN"O",#-1,F$
7560 PRINT#-1,MR,MC
7590 PRINT#-1,C$(I,J)
7630 PRINT#-1,FC$(I,J)
7650 CLOSE#-1
```

Listing 2: HEADING

```
0 REM changes for data entry
160 IF CN=1 THEN GOSUB 4000:IF E
R$<>"" THEN GOSUB 9500:GOTO 60:'
ENTER DATA
802 IM$="S"
1532 IF C8=9 OR C8=10 THEN IM$=C
8$:PRINT@PS," ";:C9=VAL(C9$):RET
URN
2562 IF MID$(IP$,I,1)<>"-" AND M
ID$(IP$,I,1)<>"," THEN ER$="DELI
MITER MUST BE '-' OR ','"
2590 REM delete line 2590
4002 IM$="M"
4022 IF IM$="M" THEN 4029
4024 IF ASC(C8$)=10 THEN O1=O1+1
:GOSUB 2570
4025 IF ASC(C8$)=9 THEN O2=O2+1:
GOSUB 3070
4026 IF ER$<>"" THEN 4029
4027 GOSUB 3500:IF ER$<>"" THEN
GOSUB 9500 ELSE 4002
4029 IM$="S"
```

Listing 3: DATA

```
0 REM changes for headings
302 IF CN=18 THEN HD=1-HD:PRINT@
32,STRING$(30,32);:PRINT@32,"HEA
DINGS "+MID$("OFFON ",3*HD+1,3);
:GOSUB 12000
532 HD=0
600 NC=18:DIM VC$(NC),V$(20)
640 DATA DAT,F,I,D,SPREAD,V,J,CR
,CC,P,S,H,ERASE,CLRD,U,VF,Q,HDG
3510 IF CN<9 AND (O1>DR+13-1 OR
O1<(DR+HD)) THEN 3550
3520 IF CN=9 AND (O1>DC+3-1 OR O
1<(DC+HD)) THEN 3550
3530 IF CN<6 AND (O2>DC+3-1 OR O
2<(DC+HD)) THEN 3550
8150 PRINT@14*32+2,"P - PRINT
   HDG- HEADINGS";
10052 IF HDG=0 OR (I<>1 AND J<>1
) THEN II=I+DR-1:JJ=J+DC-1:GOTO
10060
10054 IF I=1 AND J<>1 THEN II=1:
JJ=J+DC-1:GOTO 10060
10056 IF J=1 AND I<>1 THEN II=I+
DR-1:JJ=1:GOTO 10060
10058 GOTO 10070
10060 PRINT@96+(I-1)*30+I*2+(J-1
)*10,C$(II,JJ);
10520 FOR I=HD+1 TO 3
10580 FOR I=HD+1 TO 13
11010 DR=O1-HD:DC=O2-HD:RETURN
```

Listing 4: CELL

```
0 REM changes for alphanumeric c
ell labels
92 IF CN>7 THEN 98
94 GOSUB 17000:IF ER$<>"" THEN G
OSUB 9500:GOTO 60
96 GOSUB 3000:IF ER$<>"" THEN GO
SUB 9500:GOTO 60
98 IF CN<>9 THEN 132
132 IF CN<>8 THEN 140
134 GOSUB 17000:IF ER$<>"" THEN
GOSUB 9500:GOTO 60
136 GOSUB 17500:IF ER$<>"" THEN
GOSUB 9500:GOTO 60
534 AL$="ABCDEFGHIJKLMNOPQRSTUVW
XYZ"
780 PRINT@13*32+4,"# OF ROWS(DEF
.&MAX.=26)";:INPUT MR:IF MR=0 TH
EN MR=26
782 IF MR>26 THEN 780
2020 'GET COMMAND NAME
2040 IF INSTR(NM$+" ",MID$(IP$,I
,1))>0 THEN 2070
```

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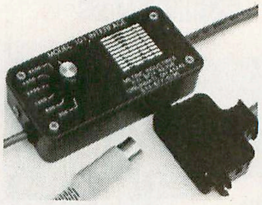
For credit card orders call (800) 847-0309, 8 a.m. to 5 p.m. EST

All other inquiries call (502) 228-4492.

```
2050 CM$=CM$+MID$(IP$,I,1)
2530 IF INSTR(NM$+" ",MID$(IP$,I
,1))>0 THEN O1$=O1$+MID$(IP$,I,1
) ELSE 2550
6540 PRINT@32,"ENTER START,END R
OW";:INPUT R1$,R2$:R1=INSTR(AL$,
R1$):R2=INSTR(AL$,R2$)
6542 IF R1=0 OR R2<R1 OR LEN(R1$
)<>1 OR LEN(R2$)<>1 THEN ER$="IN
VALID ROW":GOSUB 9500:GOTO 6530
8540 PRINT@32,"ENTER START ROW T
O CLEAR";:INPUT S2$
8542 S2=INSTR(AL$,S2$):IF S2=0 T
HEN PRINT@32,STRING$(30,32);:GOT
O 8540
9502 PRINT@32,STRING$(30,32);
10590 PRINT@64+(I*32),MID$(AL$,I
+DR-1,1);
13520 II=2:IF LEFT$(IP$,1)="R" T
HEN GOSUB 17000 ELSE GOSUB 2500
13550 IF LEFT$(IP$,1)="R" THEN G
OSUB 17500 ELSE GOSUB 3000
14040 IF INSTR(AL$,I9$)>0 THEN G
OSUB 14500:GOTO 14070
14510 O4$=""
14520 REM delete line 14520
14530 REM delete line 14530
14540 REM delete line 14540
14550 REM delete line 14550
14560 O3=INSTR(AL$,I9$)
14580 IF I>LEN(IP$) THEN 14620
14610 REM delete line 14610
14620 O4=VAL(O4$):I=I-1
17000 '*** VALID ROW? ***
17010 FOR I=II TO LEN(IP$)
17020 IF MID$(IP$,I,1)<>" " THEN
 17050
17030 NEXT
17040 ER$="ROW INVALID OR MISSIN
G":GOTO 17070
17050 O1=INSTR(AL$,MID$(IP$,I,1)
):II=I+1:IF O1=0 THEN 17040
17060 IF CN<9 AND O1>MR THEN ER$
="MAX. NO. OF ROWS IS"+STR$(MR)
17070 RETURN
17500 '*** VALID DELIMITER & SEC
OND ROW? ***
17510 IF MID$(IP$,II,1)<>"-" AND
 MID$(IP$,II,1)<>"," THEN ER$="D
ELIMITER MUST BE '-' OR ','":GOT
O 17530
17520 II=II+1:O2=INSTR(AL$,MID$(
IP$,II,1)):IF O2=0 THEN ER$="ROW
 INVALID OR MISSING"
17530 RETURN
```

Model 101 Interface $39.95



- Serial to parallel interface
- Works with any COCO
- Compatible with "Centronics" parallel input printers
- 6 switch selectable baud rates 300-600-1200-2400-4800-9600
- Small size 4.5" x 2.5" x 1.25"
- Comes complete with cables to connect to your computer and printer

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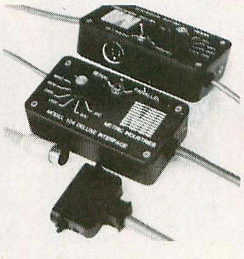
Model 104 Deluxe Interface $51.95



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- Built in serial port for your modem or other serial device
- Switch between parallel output and serial output
- Size is 4.5" x 2.5" x 1.25"
- Comes complete with cables to connect to your computer and printer

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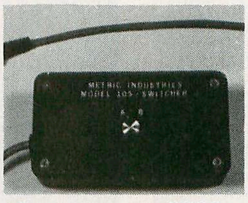
Model 102 Switcher $35.95

- Connect to your COCO serial port and have 3 switch selectable serial ports
- Color coded indicator lights show switch position
- Lights also serve as a *power on* indicator for your COCO
- Heavy guage blue anodized aluminum cabinet with non-slip rubber feet

The 101 and 104 require power to operate. Most printers can supply power to your interface. (Star, Radio Shack and Okidata are just a few that do - Epson and Seikosha do not). The interfaces can also be powered by an AC adaptor; Radio Shack model 273-1431 plugs into all models. If you require a power supply, add a "P" to the model number and add $5.00 to the price. (Model 101P $44.95, Model 104P $56.95).

Model 105 Switcher $14.95



- Connects to your COCO to give you 2 switch selectable serial ports
- 3 foot cable to connect to your COCO's serial port
- The perfect item to use to connect a printer and a modem to your COCO
- Small in size, only 4.5 x 2.5 x 1.25

The Model 101, 102, 104 and 105 work with any COCO, any level basic and any memory size. These products are covered by a **1 year warranty.**

The Model 101 and 104 work with any standard parallel input printer including Gemini, Epson, Radio Shack, Okidata, C. Ioth, Seikosha, Panasonic and many others. They support BASIC print commands, word processors and graphic commands.

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Getting 'stock' answers to your inventory questions

TAKING STOCK

By Charles May

S*tock*, a direct access inventory program, allows you to take stock of your goods, permitting up to 99,999 units per record.

The program has provisions for an 11-digit stock number, unit descriptions, purchases, returns, wholesale and retail costs, and more. Along with figuring gross profit, it also calculates final inventory balance, total purchases, gross receipts, returns and allowances, and inventory given to personal use.

All this information can be printed in an inventory report, using your printer's condensed mode to fit 133 characters on a line. The program is currently configured for a DMP-105, but it can easily be modified to accommodate other printers. (Line 890 puts the printer in condensed mode, and Line 1105 returns it to standard print. Just substitute your appropriate printer code.)

The program listing is "blocked off" in modular style, making it very easy to understand.

Running the Program

Stock is menu-driven, prompting you along. On running the program you will see the main menu and its five options:

1) Enter New Stock Numbers
2) Inventory Activity
3) Print Report
4) Review Status
5) Exit

The first step is to enter all stock numbers correctly and in proper sequence — select Option 1 from the main menu. Stock numbers can be up to 11 characters of any combination of letters and numbers — but the final three characters *must be numbers*! These three numbers will become the record number the disk uses to store and access records. They *must* begin in this sequence: 001, 002, 003 . . . 099, 100, 101, etc. For example, your first number might be A137690-001; the 001 is the disk record number.

Should you begin with any other sequence, the disk will skip space, leaving blank all unassigned records. For example, if you begin with 100 instead of 001, the disk leaves the first 99 records blank. When you printed your report, you would get nothing but garbage. It is extremely important that you assign stock and record numbers correctly.

Thirty-two spaces are assigned to the Unit Description field; five spaces are assigned to all "count" fields, and eight spaces are assigned to all "money" fields in each record. This means that the files can contain up to 99,999 units per record and dollar amounts of $99,999.99. For amounts over these limits you must alter the code.

Only the stock number, description, quantity purchased, cost and retail are entered during the initial entry routine. New purchases, sales, returns and personal use entries can be entered only as "Inventory Activities."

Inventory Activities are coded in such a way that they adhere to standard accounting principles. For instance, Total Receipts will contain receipts that are to be deducted on the returns and allowances adjustments of your income statement — and on the IRS' Schedule C of Form 1040. Other entries, such as dollar amounts of items withdrawn for personal use, are income statement adjustments, also.

Should you purchase goods that have changed in cost, you will need to make a separate record of each item as though it were a brand new entry. The stock number can be identical to the original except for the final three digits, the record number. For example, suppose stock number 3001A-019 originally cost $8.65 but now costs $9.15. Your new number might become 3001A-139. 3001A is not stored in records 019 and 139. This is the only way to keep your sales and income figures correct.

You will be asked for the *actual* selling price. If your selling price differs from retail, enter it so.

Refunds will be the total dollar amount of the refund — not the unit refund amount. For example, suppose a customer returns three items that you sold for $10 each; you refund $30 —

Charles May owns his own carpet and upholstery cleaning business and prepares taxes in season. He used his CoCo for all business transactions for three years, and now lets his IBM PC share some of the load.

enter $30.00 at the prompt.

Your report gives a final inventory balance of your stock on hand. This figure may be different from physical inventory count, but this final inventory balance must be used on your income statement and on Schedule C to show your true net income.

To begin a new year with accurate data, save the program on a new disk and reenter all stock data as though it were for the first time.

(Questions or comments about this program may be directed to the author at Rt. 1, Box 234P, Desoto, TX 75115. Please enclose an SASE when writing for a response.) ☐

```
                                            INVENTORY REPORT FOR PERIOD ENDING FEBRUARY 13, 1988
                                                                              QTY                          AMOUNT  RECEIPTS   PROFIT    UNITS
                                                   QTY    UNIT    QTY   QTY  PRSON    UNIT     AMOUNT  PERSONAL      THIS     THIS       ON
 STOCK NO.      UNIT DESCRIPTION                 PURCH    COST   SOLD RETRN   USE   RETAIL   REFUNDED       USE      ITEM     ITEM     HAND

26-3334-001 128K COLOR COMPUTER 3                   13   87.20      4     0     2   129.95       0.00    174.40    519.80   171.00        7
26-3215-002 CM-8 RGB COLOR MONITOR                  10  191.23      3     0     4   299.95       0.00    556.86    899.85   326.16        5
26-3131-003 FD-501 COLOR THINLINE DRIVE 0           10  139.74      6     0     6   299.95       0.00    836.34   1199.70   361.26        2
26-3132-004 FD-501 DRIVE 1                           6   84.19      0     0     8   179.95       0.00   1004.72      0.00     0.00        4
26-3124-005 MULTI-PAK INTERFACE                      8   53.71      3     0     0    99.95       0.00      0.00    299.85   138.72        5
26-3025-006 COLOR MOUSE                              8   19.32      3     0     9    49.95       0.00   1024.04    149.85    91.89        4
26-2226-007 RS-232 PROGRAM PAK                      10   32.65      5     0     0    79.95       0.00      0.00    399.75   236.50        5
26-1280-008 DMP-130 PRINTER                          4  248.53      2     0    10   349.95       0.00   1272.57    599.90   102.84        1
26-1385-009 DCM 212 INTELLIGENT MODEM                3  127.96      1     0    11   199.95       0.00   1400.53    199.95    71.99        1
=====================================================================================================================================
                                                      G R A N D   T O T A L S
  FINAL
INVENTORY     TOTAL      GROSS    RETURNS &   PERSONAL      GROSS
 BALANCE    PURCHASES  RECEIPTS  ALLOWANCES      USE        PROFIT
 10305.54   14474.36    4268.65       0.00     6269.46     1500.36
```

		4340	108
610	141	4520	187
2060	235	4690	231
3100	180	6150	57
3245	159	7030	53
4150	123	END	22

The listing: STOCK

```
100 '****************************
101 '*** CHARLES MAY ***
102 '*** RT. 1 BOX 234P ***
103 '*** DESOTO, TX.,75115 ***
104 '*** (214) 223-3767 ***
105 '**************************
110 '
500 '**************************
510 '** INITIALIZE VARIABLES **
520 '**************************
540 CLEAR 1000
550 F1$="QTY
 AMOUNT  RECEIPTS   PROFIT    UNI
TS"
560 F2$="QTY    UNIT    QTY   QT
Y  PRSON    UNIT    AMOUNT  PERSO
NAL   THIS     THIS       ON"
570 F3$=" STOCK NO.      UNIT DE
SCRIPTION            PURCH   CO
ST   SOLD  RETRN  USE   RETAIL
REFUNDED    USE     ITEM     ITE
M     HAND"
580 F4$="%                % %
                          % ##### ####
#.## ##### ##### ##### #####.##
#####.## #####.## #####.## #####
.##   #####"
590 F5$=STRING$(133,"=")
600 F6$="  FINAL"
610 F7$="INVENTORY      TOTAL
GROSS    RETURNS &    PERSONAL
 GROSS"
620 F8$=" BALANCE    PURCHASES  R
ECEIPTS  ALLOWANCES    USE
 PROFIT"
630 F9$=" #####.##   #####.##    #
####.##  #####.##      #####.##
#####.##"
890 PRINT#-2,CHR$(27)CHR$(20)
900 GOSUB5000
1000 '*************************
1010 '*** ROUTINE SELECTIONS***
1020 '*************************
1040 GOSUB 2000
1060 IF Z$="5" THEN 1105
1070 ON VAL(Z$) GOSUB 3000,4000,
6000,7000
1080 GOSUB 2000
1100 GOTO 1060
1105 PRINT#-2,CHR$(27)CHR$(19)
1110 CLS:CLOSE#1
1140 PRINT@200,"END OF PROGRAM"
1150 END
2000 '*************************
2010 '***    MENU    ***
```

```
2020 '*************************
2040 CLS
2050 PRINT TAB(10)"M E N U"
2060 PRINT " "
2070 PRINT "CODE      SELECTION"
2080 PRINT " "
2090 PRINT"1.-ENTER NEW STOCK NU
MBERS"
2100 PRINT"2.-INVENTORY ACTIVITY
"
2110 PRINT"3.-PRINT REPORT"
2115 PRINT"4.-REVIEW STATUS"
2120 PRINT"5.-EXIT "
2130 PRINT " "
2140 PRINT "ENTER CODE 1-5 :";
2150 Z$=INKEY$: IF Z$=""THEN2150
2160 IF Z$>="1"ANDZ$<="5"THEN 21
70 ELSE 2000
2170 RETURN
3000 '*************************
3005 '*** DATA ENTRY ***
3010 '**************************
3020 K=LOF(1):CLS:PRINT"THE LAST
 RECORD NUMBER WAS ";K
3025 PRINT" "
3030 PRINT "STRIKE ANY KEY TO CO
NTINUE"
3040 Z$=INKEY$:IFZ$=""THEN3040
3050 CLS:PRINT"ENTER NEW STOCK N
UMBER"
3060 LINE INPUT"11 CHARACTERS MA
X  "; A$
3070 RN=VAL(RIGHT$(A$,3))
3080 PRINT"ENTER STOCK DESCRIPTI
ON"
3090 LINE INPUT B$
3100 INPUT"NUMBER OF UNITS BOUGH
T";C
3110 L=C
3130 INPUT"ENTER UNIT COST";D
3140 INPUT"ENTER UNIT RETAIL PRI
CE";E
3150 PRINT"ARE ALL ENTRIES CORRE
CT? Y/N"
3155 Z$=INKEY$:IFZ$=""THEN 3155
3160 IF Z$="N" THEN CLS:GOTO 308
0
3170 IF Z$="Y"THEN 3200 ELSE 315
0
3200 LSET AA$=A$  :'STOCK NO.
3205 LSET BB$=B$  :'DESCRIPTION
3210 LSET CC$=MKN$(C)  :'QTY UNIT
S
3215 LSET DD$=MKN$(D)  :'UNIT COS
T
3220 LSET EE$=MKN$(E)  :'UNIT RET
AIL
3225 LSET GG$=MKN$(0)  :'PERSONAL
 USE
3230 LSET HH$=MKN$(0)  :'RECEIPTS
3235 LSET JJ$=MKN$(0)  :'REFUNDED
3240 LSET KK$=MKN$(0)  :'$ AMT PE
RSONAL
3245 LSET LL$=MKN$(L)  :'UNITS ON
 HAND
3250 LSET PP$=MKN$(P)  :'UNIT PRO
FIT
3255 LSET RR$=MKN$(0)  :'QTY RETU
RN
3260 LSET SS$=MKN$(0)  :'QTY SOLD
3280 PUT #1, RN
3290 PRINT"DO YOU HAVE ANOTHER E
NTRY Y/N?"
3300 Z$=INKEY$:IFZ$=""THEN3300
3320 IF Z$="Y" THEN 3050
3330 IF Z$="N" THEN 3370 ELSE 32
90
3370 RETURN
4000 '*************************
4010 '*** ACTIVITY ***
4020 '*************************
4030 CLS:PRINT"ENTER STOCK NUMBE
R"
4040 INPUT A$
4050 RN=VAL(RIGHT$(A$,3))
4060 GET #1,RN
4070 A$=AA$:B$=BB$:C=CVN(CC$):D=
CVN(DD$):E=CVN(EE$):H=CVN(HH$):J
=CVN(JJ$):L=CVN(LL$):S=CVN(SS$):
P=CVN(PP$)
```

THE POWER STONES OF ARD

THE QUEST FOR THE SPIRIT STONE

You're tired, you're hungry, not to mention you're badly injured. No one in town seems to want to talk to you. Your magic sword has stopped glowing, the room is dark, you're out of spells, you can't get your wand to work, you won't swear to it but you may be lost, you have no idea what that last puzzlement, and you hear something large moving just beyond the only door. The old sage warned you there would be days like this!

"QUEST FOR THE SPIRIT STONE" is an Adventure that will keep you playing for hours. It features single keystroke commands, 16 color graphics, 100% Hi-Res graphics screens, full game save, extensive playing area, level advancement, and the disk is not copy-protected. You choose your character's name, race, sex, and ability scores. The use of arrow keys simplify movement. This one is easy to play but a challenge to complete!

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```
4080 CLS:PRINTTAB(10)A$
4090 PRINTB$
4120 PRINTTAB(5)"1.-PURCHASES"
4130 PRINTTAB(5)"2.-SALES"
4140 PRINTTAB(5)"3.-RETURNS/ALLO
WANCES"
4150 PRINTTAB(5)"4.-PERSONAL USE
"
4160 PRINTTAB(5)"5.-REVIEW ONLY"
4170 PRINTTAB(5)"6.-EXIT TO MAIN
 MENU"
4180 PRINT" "
4190 PRINT"SELECT 1 - 6"
4200 Z$=INKEY$:IF Z$=""THEN4200
4210 IF Z$>="1"ANDZ$<="6"THEN421
5 ELSE 4080
4215 IF Z$="6"THEN 4690
4220 CLS:PRINTTAB(10) A$
4230 PRINT B$
4240 PRINT @64,"QUANTITY UNITS O
N HAND ";L
4250 PRINT"TOTAL UNITS BOUGHT ";
C
4260 PRINT"UNIT COST ";D
4270 PRINT"UNIT RETAIL ";E
4275 PRINT"NUMBER UNITS SOLD";S
4290 PRINT" ":PRINT" "
4300 ON VAL(Z$) GOTO 4310,4380,4
470,4560,4660,4690
4310 INPUT"ENTER NUMBER UNITS BO
UGHT ";N
4320 PRINT"ARE YOU SURE? Y/N"
4330 Y$=INKEY$:IFY$=""THEN4330
4340 IF Y$="N"THEN4310ELSEIFY$="
Y"THEN4350ELSE4320
4350 C=C+N:L=L+N:N=0
4360 LSET CC$=MKN$(C):LSET LL$=M
KN$(L)
4370 GOTO 4650
4380 INPUT"ENTER NUMBER UNITS SO
LD ";N1
4390 PRINT"ENTER ACTUAL SALES PR
ICE PER "
4400 INPUT "UNIT ";N2
4410 PRINT"ARE YOU SURE? Y/N"
4420 Y$=INKEY$:IFY$=""THEN4420
4430 IF Y$="N"THEN4380ELSEIFY$="
Y"THEN4435ELSE4410
4435 H=H+(N1*N2): LSET HH$=MKN$(
H)
4440 L=L-N1:S=S+N1:P1=(N1*N2)-(D
*N1):P=P+P1:P1=0:N1=0:N2=0
4450 LSET LL$=MKN$(L):LSETPP$=MK
N$(P):LSET SS$=MKN$(S)
4460 GOTO 4650
4470 INPUT"ENTER NUMBER UNITS RE
TURNED FOR REFUND";N3
4475 INPUT"HOW MANY CAN BE RESOL
D?";N4
4480 PRINT"ENTER AMOUNT YOU REFU
NDED"
4485 INPUT N5
4490 PRINT"ARE YOU SURE? Y/N"
4500 Y$=INKEY$:IFY$=""THEN4500
4510 IFY$="N"THEN4470ELSEIFY$="Y
"THEN4520ELSE4490
4520 L=L+N4 : R=R+N4 : J=J+N5 :
S=S-N4: N4=0: N5=0
4525 LSET LL$=MKN$(L): LSET RR$=
MKN$(R) : LSET JJ$=MKN$(J) : LSE
T SS$=MKN$(S)
4530 GOTO 4650
4560 PRINT"ENTER NUMBER UNITS YO
U/YOUR      FAMILY USED OR YOU GA
VE AWAY"
4570 INPUT N6
4580 PRINT"ARE YOU SURE?  Y/N"
4590 Y$=INKEY$:IFY$=""THEN4590
4600 IF Y$="N"THEN4560ELSEIFY$="
Y"THEN4620ELSE4580
4620 L=L-N6:K=K+(N6*D):G=G+N6:N6
=0
4630 LSET LL$=MKN$(L):LSETKK$=MK
N$(K):LSET GG$=MKN$(G)
4640 GOTO 4650
4650 PUT #1,RN
4655 N=0:N1=0:N2=0:N3=0:N4=0:N5=
0:N6=0
4660 PRINT @ 448,"DO YOU HAVE AN
OTHER ACTIVITY?"
4670 Y$=INKEY$:IFY$=""THEN4670
4680 IF Y$="Y"THEN4030ELSEIFY$="
N"THEN4690ELSE4660
4690 RETURN
5000 '**************************
5010 '***** OPEN FILES ********
5020 '**************************
5030 OPEN "D",#1,"INV",116
5040 FIELD 1, 11 AS AA$,32 AS BB
$,5 AS CC$,8 AS DD$,5 AS SS$,5 A
S RR$,5 AS GG$,8 AS EE$,8 AS JJ$
,8 AS KK$,8 AS HH$,8 AS PP$,5 AS
 LL$
5050 RETURN
6000 '**************************
6010 '*** PRINT REPORT ***
6020 '**************************
6030 CLS:PRINT"ENTER TODAY'S DAT
E"
6040 PRINT"EXAMPLE:  JANUARY 10,
 1988"
6050 LINE INPUT W$
6055 W$="INVENTORY REPORT FOR PE
RIOD ENDING "+W$
6060 W=LEN(W$):W1=INT((133-W)/2)
6070 CLS:PRINT"I'M WORKING ON YO
UR REPORT"
6080 PRINT#-2,TAB(W1)W$
6090 PRINT#-2," "
6100 PRINT#-2,TAB(73)F1$
6105 BI=BI+(L*D)
6110 PRINT#-2,TAB(46)F2$
6120 PRINT#-2,F3$
6130 PRINT#-2," "
```

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VIP Writer III automatically formats your text for you or allows you to format your text in any way you wish. You can change the top, bottom, left or right margin and page length. You can set your text flush left, center or flush right. You can turn right hand justification on or off. You can have headers, footers page numbers and TWO auxiliary lines which can appear on odd, even or all pages. You can also select the line on which they appear! You can even change the line spacing! All of these format parameters can be altered ANYWHERE within your text file.

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Mission Interchangeable

By Joseph Kolar
Rainbow Contributing Editor

Every time you flip through the pages of THE RAINBOW and are inspired to park yourself in front of the beloved CoCo, you should expect to discover something new. New in the sense that, after tossing aside THE RAINBOW and turning off panting CoCo for the night, you have added some new insights to your ever-expanding core of CoCo lore.

As a newcomer to BASIC, you may be awed and overwhelmed by its vast complexity. It can be intimidating! CoCo is so powerful that when you discover a routine or technique you are comfortable with, you have a tendency to use it exclusively and rest on your laurels.

One of the features of the `DRAW` (as well as the `PLAY`) statement I have never mentioned is the `X` option, which executes sub-strings and returns. I was so enamored with concatenation that I saw no need for this feature. It appeared as an alternate method to perform a particular task. Everyone knows that CoCo has more than one way to accomplish a mission.

In last month's tutorial, we studied Ann B. Mayeux's delightful children's program, *ABC* (September 1987, Page 58).

Instead of using my sacred concatenation technique of displaying lettering on the Hi-Res screen (on CoCos 1 and 2 — Lo-Res in CoCo 3), she used the `DRAW X` option.

In the process of copying her listing, I noted three facts. It's easier to type `XB$;` than `+B$`. Why? In the all-caps mode, the SHIFT key is used only once in the four keystrokes. In the comparable concatenation sequence, SHIFT is used twice in three keystrokes. This constant shifting bodes evil for the average, non-expert typist. Personally, in long, concatenated lines, I am apt to strike a '4' for a '$', or a ';' for a '+', in my "shift-no-shift-shift" sequence.

In Line 480 of Ann Mayeux's listing, I noticed that she had managed to get the entire word into one `DRAW` statement line. I suspect that I would have reached CoCo's limit had I used concatenation — somewhere in the middle of the word `ALLIGATOR` I would probably have gotten an LS Error message, signifying that the string was too long (more than 255 characters) . . . not to mention the OS Error message, even earlier on, warning that CoCo was sulking because not enough string space was cleared.

These observations made me recall that I hadn't seen or used a `CLEAR` statement in the program.

Noticing things is OK. If you fail to study and learn from your observations, you may be missing an opportunity to add to your growing storehouse of CoCo facts.

The best way for a beginner to proceed is to experiment. How? By making a small program to compare the two techniques. Refer to listing `COMPARE`.

Stoke up CoCo and key in Lines 10 and 100. We want a `PMODE 4` panel and a perpetual loop to hold our creation on the screen.

We need some string variable material to put into our `DRAW` lines. Lines 20 and 30 create the letters `A` and `B`, respectively.

Key them in. Key in Line 50. Within quote marks, we size and locate the first letter, `A`, hidden in variable `A$`. Consider the data inside the quote mark as a choo-choo locomotive. Each concatenated (+) string variable can be likened to a freight car, and each freight car is connected to the one before it. Our sequence is one 'A' car and one 'B' car, repeated until CoCo squirms in protest.

Run our mini-program of lines 10 through 100 (Listing 1). Three sets of `AB`s appear on the screen. Press BREAK. Enter `EDIT50`, press X to jump to the end of the line, type `+A$`, press ENTER again and run. Oops! OS Error!

Press BREAK, enter `5 CLEAR500` and run. CoCo breathes a sigh of relief. Add as many freight cars as CoCo can stand. Run again. Nine more freight cars can be added to the freight train before CoCo throws up its hands in despair and hollers, "LS Error!"

Count the letters within the quote marks in lines 20 and 30 (14 and 19, respectively). Count the number of freight cars in Line 50 — first the `A$` and then `B$` (8 and 7, respectively).

Perform these calculations with the `PRINT` command, pressing ENTER after each (and make sure your answer matches mine):

Enter	Answer
`PRINT14*8`	112
`PRINT19*7`	133
`PRINT112+133`	245
`PRINT245+9`	254

Edit Line 50 to Size 12, adding one space to Line 50. Run. 255 is OK. Ignore the runaway lettering that is slipping off the screen. Now, press BREAK, enter `EDIT50` and press the space bar until the cursor is over the `0` in `10`. Press I to go into the Insert mode. Type `0` to turn the `10` into `100`. Press ENTER and run. No good. To get rid of the extra `0` and return Line 50 to its earlier state, enter `EDIT50` and press the space bar until the cursor is over either `0` in `100`. Press D (for delete), then press ENTER and run.

Observe that we used CoCo as a calculator to do necessary arithmetic. There is no need to resort to pencil and paper. This calculator feature is often overlooked by the novice, but it is very useful. For instance, if we did a series of `PRINT@` relocations, we could wind up with a line like this:

```
110 CLS:PRINT@ 190+64+16,"
```

etc.

Execute by entering `RUN110`. But by doing the necessary calculations on CoCo in the command mode, we get the same result: Entering `PRINT190+64+16` yields the result of `270`. With a one, two, three, we have a more meaningful, compact line.

Edit Line 110 by entering `EDIT110`. Press the space bar until the cursor is over the `1` of `190`, type `3C` and then `270` (to change `190` to `270` — you change three characters). Then type `6D` to delete six characters, press ENTER, and enter `RUN110`. By entering `RUN110` we get around the graphics mode into the text

---

Florida-based Joseph Kolar is a veteran writer and programmer who specializes in introducing beginners to the powers of the Color Computer.

mode without disturbing either program. Line 100 keeps the graphics page from spilling over into the text page.

Back to work! Change the value in Line 50 to S8. Key in Line 60. Note that every sub-string is a part of the DRAW statement. Thus, unlike concatenation, which adds, executing sub-strings stuffs the string variables within the quote marks of DRAW statements. The closing quote is optional. Run. Note that CoCo happily romped off the screen.

Do we need CLEAR? Not to execute sub-strings.

Press BREAK and enter EDIT50. Press X to jump to the end of Line 50. Use the left arrow key to eliminate the fourth +A$, press ENTER, and run. Press BREAK, enter 5 CLEAR0 and run. No good. Mask Line 50 with REM. Run again. No, we do not require CLEAR. Change the value in Line 50 to SX4 and run again.

Find out how many As and Bs you can display in Line 60 before CoCo drops over the edge.

Remember to remove the final quote, stuff away and add the closing quote. You will find that CoCo is getting so bloated that he drunkenly staggers off the right side of the screen.

Now, we know for sure concatenation is fine, but executing sub-strings with the X option gives us a bigger bang for our typing efforts; it's simpler to use, and the keystrokes are more manageable. We need not clear string space and, as a bonus, we save memory.

Enter 5 CLEAR 500 and unmask Line 50. To see the minimum amount of memory you must reserve for the scoop in Line 50, enter 5 CLEAR and find the lowest value required. Do it the trial-and-error way. Try other values. When you get the lowest value that will allow CoCo to operate Line 50 — congratulations!

Now enter 5 CLEAR 200 and EDIT50. Type 84, press the space bar, then press H and ENTER. Enter DEL5 and run.

You may want to save your work as COMPARE at this time. Enter NEW.

Our second project for today's consideration is a routine to label PMODE 4 graphics pages I want to save to disk. I wanted to create a graphics page filename that I could use as the title when I saved the display. A single-code character would identify the particular graphics routine utilized. A three-numeral value would be assigned to the first variable, and a two-numeral value would identify the second variable.

This identifying label would read T000-00 through T999-99 and appear in the upper left-hand corner. On the input of a single digit, it is necessary that the blank tens and hundreds columns house zeros (so that 003 or 3 give the same result). These completed codes become the title of the graphic.

What does this have to do with you? This tutorial explains one way to accomplish the mission. Between lines 110 and 700 you can put some sort of graphics routine that has one or two inputted numbers. You can adjust this program by deleting unnecessary lines or unwanted multiple-line statements to suit your requirements.

There are two parallel constructions between lines 10 and 100. Key in the INDEX listing. Line 10 calls for a variable consisting of from one to three digits — or none, if you choose N. The first statement in Line 30 creates a string variable by converting N into X$.

Each of the three digits will be plucked out of X$ and assigned a separate string variable in lines 40 through 60. Line 60 contains A$, the hundreds column digit. Line 40 fingers B$, the tens column digit, and Line 50 picks out C$, the units column digit. MID$ and RIGHT$ were used to pinpoint the desired digit.

CoCo has to be told what to do in the event of a single-digit number being called. The hundreds column contains a zero rather than the contents of MID$(X$,2,1). It also has to check the same status of the other variable, Z, in the tens column.

If N is between 0 and 99, Line 80 determines that the hundreds column digit is zero and the tens column digit is whatever a MID$(X$,2,1) turns up.

If you add the command :GOTO100 to the end of Line 60 and input various values, you will see that lines 70 through 90 are needed. Can you figure out why? What if you changed the value of B$=MID$(X$,2,1) to 0? Why would this maneuver present problems?

Chew on this: If the hundreds column is null or empty, then surely A$ equals 0 in all instances. The digit in the tens column might, or might not, be a zero. B$=MID$(X$,2,1) or B$=LEFT$(X$,2) will pull out whatever is in the tens column.

Why doesn't LEFT$(X$,1) work? Put on your thinking cap and try some variables — you can use your direct mode to see what number was selected. Press BREAK and enter PRINT LEFT$(X$,2). Lop off :GOTO100 from Line 60.

A parallel construction was used for the second variable, Z. See the second statement in lines 30 through 50 and Line 90.

The next step (GOSUB1000) involves a jump to the routine in Lines 1000 through 1140 to allow CoCo to memorize the variables that create the numerals 0 through 9 and the letters A, B and T and a dash (—). It returns and sets up the PMODE 4 screen.

Line 110 is what it is all about. We draw Size 8 at location 3,15 (horizontal, vertical) using concatenation; T$ designates the series. Then we draw whatever values were in the three-digit input, a dash, and whatever values were in the two-digit input. To save our work, enter CSAVE″INDEX″.

A two-line graphics routine illustrates an imperfect use of this program. Insert these lines:

```
200 DRAW″BM=N;,=Z;R5F7R5″
210 CIRCLE(N+17,Z+8),6,1
```

Try various combinations of N and Z inputs ranging from N=0 to 221 and Z=16 to 99.

For the intrepid CoConaut: If you want to refine this program, change lines 10 and 20 to read allowed input values. Include a couple of IF lines to reject out-of-bounds entries.

Better yet, revise Z values to allow for a three-digit number, so you can hop all over the entire screen vertically, from 16 to the highest allowable value without drifting down off the screen. This should be an exciting, fun challenge for you.

Listing SAVELOAD may now be keyed into your working program. It was condensed and revised from "Demonstration in Art" by Ricky Sutphin (Page 80, October '87). His program, COCOART, allows you to save, load, view and draw PMODE 4 graphics screens with a disk system.

We're now finished with the file number creating program, the short demo graphic and the utility to save, load, view and draw more graphics into a larger program. You might want to save the whole thing as ″TOTAL″ to have it handy. You never know when you might need it.

This listing can be used with any suitable graphics program. Merely change Line 780 to an appropriate line number to link up with your revised TOTAL.

TOTAL is a combination of INDEX, the two-line graphic demo and SAVELOAD. TOTAL contains Line 1, not found in INDEX, and deletes Line 999 as redundant.

If you want to save SAVELOAD as a

separate program, enter `DEL-210`. Then enter `DEL999-`. You will be able to save, load and view any existing graphics you have squirreled away. You will not be able to draw a new graphic but that is life . . . and why we saved `TOTAL`.

If you want to use `SAVELOAD` or `TOTAL` with a cassette-based system, revise lines 820 and 880 to the following:

```
820 CSAVEM N$,1536,7679,1536
880 CLOADM N$
```

Position your tape and you are in business.

There is no better way to get the maximum utility from your CoCo than to read THE RAINBOW, get intrigued by something and experiment. If you find something useful or potentially valuable in the distant future, save the listing and write it up, in words that have significance to you, in your personal reference notebook.

You have two stand-alone programs you can adjust to use in any manner your creative urge beckons. These routines may suggest other areas to investigate and projects to attempt. You are encouraged to explore and find uses for these utility programs. It always generates satisfaction when you learn something new or are dimly reminded of facts once learned but tucked into the dark reaches of your unconscious. Bring them out into *the open* and let them flower. □

Listing 1: `COMPARE`

```
0 '<COMPARE> CONCATENATION WITH
SUB-STRING EXECUTION
10 PMODE4,1:PCLS:SCREEN1,0
20 A$="U6R4D3NL4D3BR3"
30 B$="U6R3FDGNL3FDGNL3BR4"
50 DRAW"S8BM10,20"+A$+B$+A$+B$+A
$+B$
60 DRAW"BM10,50XA$;XB$;XA$;XB$;X
A$;XB$;XA$;XB$;XA$;XB$;XA$;XB$;X
A$;XB$;XA$;XB$;XA$;XB$;"
100 GOTO100
```

Listing 2: `INDEX`

```
0 '<INDEX> IDENTIFYING NUMBERS
FOR SAVED GRAPHIC SCREENS
10 CLS:FORX=1TO4:PRINT:NEXT:INPU
T"     ENTER NUMBER OF DESIGN
           000 THRU 999";N
20 PRINT:INPUT"                TIM
ER                      00 THRU
 99";Z
30 X$=STR$(N):Y$=STR$(Z)
40 B$=MID$(X$,3,1):J$=MID$(Y$,2,
1)
50 C$=RIGHT$(X$,1):K$=RIGHT$(Y$,
1)
60 A$=MID$(X$,2,1)
70 IF N<10 THEN A$="0":GOTO90
80 IF N<100 AND N>9 THEN A$="0":
B$=MID$(X$,2,1)
90 IF Z<10 THEN J$="0"
100 GOSUB1000:PMODE4,1:PCLS:SCRE
EN1,0
110 DRAW"S8BM3,15"+T$+N$(VAL(A$)
)+N$(VAL(B$))+N$(VAL(C$)):DRAWQ$
+N$(VAL(J$))+N$(VAL(K$))
999 GOTO999
1000 N$(1)="BR4NU4BR"
1010 N$(2)="BR2U2R3U2NL3BD4NL3"
1020 N$(3)="BR2R3U2NL2U2NL3BD4"
1030 N$(4)="BE2NU2R3U2D4"
1040 N$(5)="BR2R3U2L3U2R3BD4"
1050 N$(6)="BR2U4NR3D2R3D2NL3"
1060 N$(7)="BR2BU3UR3D4"
1070 N$(8)="BR2U4R3D2NL3D2NL3"
1080 N$(9)="BE2NR3U2R3D4"
1090 N$(0)="BR2U4R3D4NL3"
1100 D$="BR2U4R3D2NL3D2"'A
1110 E$="BR2U4R2FGNL2FGNL2BR"'B
1120 Q$="BE2R3BD2"'DASH
1130 T$="BR4U4NL2R2BD4"'T
1140 RETURN
```

Listing 3: `SAVELOAD`

```
260 CLS:PRINT:PRINT"        COCO
GRAPHICS DEMO","            ME
NU"
270 PRINT,,,,"    [1] SAVE IT","
[2] LOAD IT",,,"          [3] VI
EW IT",,,,,,,"     ENTER OPTION
 NUMBER"
280 A$=INKEY$:IFA$=""THEN280
290 IF A$="1"THENGOSUB380
300 IF A$="2"THENGOSUB450
310 IF A$="3"THENGOSUB490
370 GOTO260
380 CLS:FORX=1TO5:PRINT:NEXT:INP
UT"  GIVE IT A NAME";N$
390 IF N$=""THEN380
400 IF LEN(N$)>12THENPRINT"  THA
T'S TOO LONG":FORX=1TO500:NEXT:G
OTO380
410 SAVEM N$,3584,9727,3584
420 PRINT"          ITS DISK FILE NAM
E IS:                ";N$
430 FOR X=1TO4000:NEXT
440 GOTO260
450 CLS:FORX=1TO5:PRINT:NEXT:INP
UT"      NAME AND EXTENTION....
...........";N1$
460 IF N1$=""THEN450
470 LOADM N1$
480 GOTO260
490 PMODE4,1:SCREEN1,1
500 A$=INKEY$:IFA$=""THEN500ELSE
260
```

Listing 4: `TOTAL`

```
0 '<TOTAL> (<INDEX>, TWO LINE
GRAPHIC ROUTINE, <SAVELOAD> COM-
BINED)
1 'OMIT LINES 200-930
10 CLS:FORX=1TO4:PRINT:NEXT:INPU
T"     ENTER NUMBER OF DESIGN
          000 THRU 999";N
20 PRINT:INPUT"               TIM
ER                 00 THRU
 99";Z
30 X$=STR$(N):Y$=STR$(Z)
40 B$=MID$(X$,3,1):J$=MID$(Y$,2,
1)
50 C$=RIGHT$(X$,1):K$=RIGHT$(Y$,
1)
60 A$=MID$(X$,2,1)
70 IF N<10 THEN A$="0":GOTO90
80 IF N<100 AND N>9 THEN A$="0":
B$=MID$(X$,2,1)
90 IF Z<10 THEN J$="0"
100 GOSUB1000:PMODE4,1:PCLS:SCRE
EN1,0
110 DRAW"S8BM3,15"+T$+N$(VAL(A$)
)+N$(VAL(B$))+N$(VAL(C$)):DRAWQ$
+N$(VAL(J$))+N$(VAL(K$))
200 DRAW"BM=N;,=Z;R5F7R5"
210 CIRCLE(N+17,Z+8),6,1
700 '<SAVELOAD> VIEW
710 A$=INKEY$:IFA$=""THEN710
720 CLS:PRINT:PRINT"          COCO
 GRAPHICS DEMO","              M
ENU"
730 PRINT,,,"  [1] SAVE IT","[2
] LOAD IT",,,"  [3] VIEW IT","[4
] DRAW IT",,,,,"     ENTER OPTI
ON NUMBER"
740 A$=INKEY$:IF A$="" THEN740
750 IF A$="1" THEN GOSUB800
760 IF A$="2" THEN GOSUB860
770 IF A$="3" THEN GOSUB900
780 IF A$="4" THEN GOTO10
790 GOTO720
800 GOSUB920
810 IF N$=""THEN800
820 SAVEM N$,3584,9727,3584
830 PRINT"     ITS DISK FILE NAM
E IS:                 ";N$
840 FOR X=1TO 4000:NEXT
850 GOTO720
860 GOSUB920
870 IF N$=""THEN860
880 LOADM N$
890 GOTO720
900 PMODE4,1:SCREEN1,1
910 A$=INKEY$:IF A$=""THEN910ELS
E720
920 CLS:PRINT@202,"":INPUT"
NAME / EXTENSION...............
..";N$
930 RETURN
1000 N$(1)="BR4NU4BR"
1010 N$(2)="BR2U2R3U2NL3BD4NL3"
1020 N$(3)="BR2R3U2NL2U2NL3BD4"
1030 N$(4)="BE2NU2R3U2D4"
1040 N$(5)="BR2R3U2L3U2R3BD4"
1050 N$(6)="BR2U4NR3D2R3D2NL3"
1060 N$(7)="BR2BU3UR3D4"
1070 N$(8)="BR2U4R3D2NL3D2NL3"
1080 N$(9)="BE2NR3U2R3D4"
1090 N$(0)="BR2U4R3D4NL3"
1100 D$="BR2U4R3D2NL3D2"'A
1110 E$="BR2U4R2FGNL2FGNL2BR"'B
1120 Q$="BE2R3BD2"'DASH
1130 T$="BR4U4NL2R2BD4"'T
1140 RETURN
```

PRINTERS!

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NOVICES NICHE

THE RAINBOW is a teaching environment and we realize that the majority of our readers will always be beginners. In our continuing effort to always keep the new user in mind, and in addition to the many beginner feature articles and programs published in every issue, "Novices Niche" contains shorter BASIC program listings that entertain as well as help the new user gain expertise in all aspects of the Color Computer: graphics, music, games, utilities, education, programming, etc.

Business

In Good Form

16K
ECB

By E.C. Thompson

With *Receipt* you can print out personalized receipts, four to a page. What are the advantages of using your computer and printer for this? Well, there are three big ones: durability — when you use quality paper; convenience — with your hardware and this program, you'll never run out of receipts; and economy — personalized forms at less than one-fourth the cost of commercial equivalents.

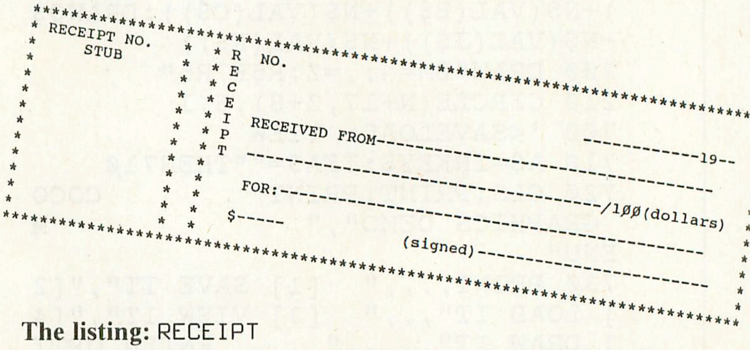
On running the program, you are prompted for your printer's baud rate. Then you are asked if you would like normal printing or double strike (bold type). Finally, you are prompted for how many pages of receipts you want (remember — four to a page). After you answer these three questions, your forms will begin printing out.

The printed form has two parts, the receipt itself and a stub for your records. On both the stub and the receipt, there is room for an identifying number.

After cutting out the receipts, you may want to punch holes in the left margin and store the forms in a loose-leaf binder. To facilitate detaching the receipt from the stub, you can make perforations along the border with a sewing machine.

To personalize your receipt, edit Line 200 by typing in your street address. Count the number of spaces it takes up and delete that number of spaces immediately after the address — this keeps the right margin properly aligned. Edit Line 210, adding your city and state, counting spaces and deleting as before. Similarly, your name can be added in Line 310 to fit below the "signed" space.

In addition, the baud rate selector can be detached from the program and added to any other program you want to work with the printer.



RECEIPT NO.
STUB

R
E
C
E
I
P
T

NO.

RECEIVED FROM---------------------------------- -----------19--

FOR:--/100(dollars)

$-----

(signed)----------------------------

The listing: RECEIPT

```
5 CLS3:PRINT@4,"**BAUD RATE SELE
CT0R**";
10 PRINT@72,"1). BAUD 600";
15 PRINT@136,"2). BAUD 1200";
20 PRINT@196+4,"3). BAUD 2400";
25 PRINT@200+95,"ENTER 1, 2, OR
3";:INPUT D
30 ON D GOTO 35, 40, 45
35 D=87:GOTO50
40 D=41:GOTO50
45 D=18:GOTO 50
50 POKE150,(D)
80 CLS(3):PRINT@196,"DOUBLE STRI
KE (Y OR N)";:INPUT F$
90 IF F$="Y"THEN GOTO110
100 IF F$="N" THEN GOTO 120
110 O=31:GOTO 130
120 O=19:GOTO 130
130 PRINT#-2,CHR$(27);CHR$(O)
140 CLS3
150 PRINT@194,"HOW MANY PAGES WI
LL I PRINT";:INPUT C
160 FOR P=1 TO C
170 CLS6:PRINT@168,"P R I N T I
N G";
180 FOR X=1 TO 4
```

```
190 PRINT#-2,STRING$(77,42)
200 PRINT#-2,"* RECEIPT NO.         *
 * R  NO.
                               *"
210 PRINT#-2,"*        STUB         *
 * E
                               *"
220 PRINT#-2,"*                     *
 * C
          ------------19--     *"
230 PRINT#-2,"*                     *
 * E
                               *"
240 PRINT#-2,"*                     *
 * I  RECEIVED FROM-------------
----------------------         *"
250 PRINT#-2,"*                     *
 * P
                               *"
260 PRINT#-2,"*                     *
 * T  ----------------------------
------------/100(dollars)      *"
270 PRINT#-2,"*                     *
 *
                              *"
280 PRINT#-2,"*                   *
 *    FOR:---------------------
---------------------         *"
290 PRINT#-2,"*                   *
 *
                              *"
300 PRINT#-2,"*                   *
 *    $-----            (signed)-
----------------------        *"
310 PRINT#-2,"*                   *
 *
                              *"
320 PRINT#-2,STRING$(77,42)
330 PRINT#-2,STRING$(77,46)
340 NEXT X
350 PRINT#-2,STRING$(4,13)
360 NEXT P
370 PRINT@325,"* * * FINISHED *
 * *";
380 PRINT@388+2,"CONTINUE?<any k
ey>";
390 EXEC44539:GOTO100
```

Worksheet Printer

16K
ECB

By Don Hitko

Have you ever wanted to make a quickie spreadsheet, but you didn't feel like fooling with the "cells" of a computerized 'sheet? And even with a straightedge your handmade charts come out crooked? Well, *Worksheet Printer* is here! Whether you're filling in a seating chart or roughing out assignments for your sales crew, this program provides a quick means to see what goes where and how much.

Worksheet Printer uses printer graphics characters to draw a sheet (to be used horizontally) with 19 rows and 10 columns. It is configured for a DMP-200, but should work as is on the entire line of DMP printers. For those with other printers, these are the codes that should be changed:

Line Number	Printer Code	Description
320	27 28	Half forward line feed
440	241	Horizontal Bar (-)
440	250	Cross (+)
480	245	Vertical Bar (|)

For those with 132-column printers, the number of repetitions of the loops starting in lines 430 and 470 can be increased to allow for more rows. If you are using fanfold paper and want a sheet with more columns, increase the number of repetitions in the loop beginning in Line 330.

Now you can sit in front of your spreadsheet program, brimming with confidence, knowing exactly what you're going to do before you start!

The listing: SHEET

```
10 CLS
20 PRINT" SPREAD-SHEET WORKSHEET
 PRINTER"
30 PRINTTAB(10);"BY DON HITKO"
40 PRINT:PRINT
50 PRINTTAB(12);"<1> 600"
60 PRINTTAB(12);"<2> 1200"
70 PRINTTAB(12);"<3> 2400"
80 PRINTTAB(12);"<4> 4800"
90 PRINTTAB(12);"<5> 9600"
100 PRINT:PRINTTAB(6);"PLEASE SE
LECT PRINTER"
110 PRINTTAB(12);"BAUD RATE"
120 I$=INKEY$:IF I$="" THEN 120
130 IF I$<"1" OR I$>"5" THEN 120
140 ON VAL(I$) GOTO 150,160,170,
180,190
150 POKE &H96,&H57:GOTO 200
160 POKE &H96,&H29:GOTO 200
170 POKE &H96,&H12:GOTO 200
180 POKE &H96,&H07:GOTO 200
190 POKE &H96,&H01
200 CLS
210 PRINT" SPREAD-SHEET WORKSHEE
T PRINTER"
220 PRINTTAB(10);"BY DON HITKO"
230 PRINT@320,"HOW MANY COPIES W
OULD YOU LIKE  PRINTED?"
240 PRINT"->";:LINE INPUT C$
250 CLS
260 PRINT" SPREAD-SHEET WORKSHEE
T PRINTER"
270 PRINTTAB(10);"BY DON HITKO"
280 PRINT@329,"PRINTING COPY:"
290 IF VAL(C$)<1 THEN 200
300 FOR C=1 TO VAL(C$)
310 PRINT@366,C
320 PRINT #-2,CHR$(27);CHR$(28)
330 FOR A=1 TO 11
340 GOSUB 430
```

```
350 FOR B=1 TO 10
360 GOSUB 470
370 NEXT B,A
380 FOR D=1 TO 11
390 PRINT#-2
400 NEXT D
410 NEXT C
420 END
430 FOR X=1 TO 20
440 PRINT #-2,STRING$(3,241);CHR
$(250);
450 NEXT X
460 RETURN
470 FOR Y=1 TO 20
480 PRINT #-2,STRING$(3,32);CHR$
(245);
490 NEXT Y
500 RETURN
```

Utilities

Creating Data Files

16K
Disk

By Raymond Doss

Filedata can be used to produce a single-dimensioned alphanumeric string file. What good is that? Programming economy! If a file is produced in this fashion, the program's `DATA` statements do not have to be in the program. `DATA` statements use memory; if there are no `DATA` statements, there's more memory for the program.

Filedata allows the user to set two internal dimensions from the first input. The first structures the input strings and the second loads the file and displays it back onscreen. The routine is designed for disk use, but modifications could be made for use on tape systems.

Type in the program and run it. At the first prompt (for strings), type in the number of strings to be entered. This sets both internal dimensions. Don't be shocked at the string input stage — the absence of a question mark is a feature of the `LINE INPUT` command. The up arrow key can be used at any time to exit, produce and display the file onscreen. More string space can be cleared in Line 10 if needed.

What are the rules for input? Simple! If you see it on the keyboard and it can be displayed on the screen, it'll work.

The listing: `FILEDATA`

```
1 '***************************
2 'DATA-FILES: BY RAYMOND DOSS
3 'CONSTRUCT SINGLE DIMENSIONED
4 'ALPHA-NUMERIC FILES -RGD*87-
5 '(PS: COMMAS WORK TOO!)
6 '***************************
10 CLS:CLEAR2000:GOSUB90
20 INPUT"HOW MANY STRINGS";NS:DI
M AN$(NS),BN$(NS):GOSUB90
30 FORN=1 TO NS:PRINT"STRING#"N,
"BYTES="BY
40 PRINT:PRINT"ENTER STRINGS BEL
OW. COMMAS CAN BE USED. USE '^'
FOR FAST FILE."
50 PRINT:LINEINPUT"";AN$(N)
60 B=LEN(AN$(N)):BY=BY+B
70 IF AN$(N)=CHR$(94)THEN100
80 GOSUB90:NEXTN:N=N-1:GOTO100
90 CLS:PRINTSTRING$(32,42);:PRIN
T"***********DATA-FILES*********
**";:PRINTSTRING$(32,42);:RETURN
100 NN=N:CLS:GOSUB90:INPUT"FILEN
AME/EXT";F$:OPEN"O",#1,F$
110 FOR N=1 TO NN:PRINT#1,AN$(N)
120 NEXTN:CLOSE#1
130 CLS:PRINT"**LOADING FILE**:
";F$
140 OPEN"I",#1,F$:N=1
150 LINEINPUT#1,BN$(N)
160 IF EOF(1)=-1THEN180
170 N=N+1:GOTO150
180 CLOSE#1:M=N
190 FORN=1 TO M:PRINTBN$(N):NEXT
N
200 END
```

Reading Data Files

16K
Disk

By Bill Bernico

A pen pal recently sent me a disk with a bunch of data files containing the solutions to several games. Well, not knowing too much about the structure of data files or how to see what's inside them, I sat down with my CoCo manual and figured out how to get at the contents and display them. This easy-to-use program, *File Reader*, resulted.

File Reader asks you only three questions — the first is the name and extension of the file to be displayed. The second asks whether you want the contents of the file output to the screen or to the printer. If you choose output to the printer, the contents are immediately printed out. If you choose to have the file output to the screen, you must press the space bar to advance every line of data in that file — this is to prevent the contents from scrolling by too fast. (You don't have to sit with your fingers poised to press the SHIFT-@ combination in order to pause the scroll.) The third and final prompt merely asks if you want to read another file.

The listing: `FILEREAD`

```
10 'FILE READER
20 'FROM KROMICO SOFTWARE
30 'BY BILL BERNICO
40 '
50 CLS:CLEAR 5000
60 INPUT"FILENAME/EXT";A$
```

```
70 PRINT"OUTPUT TO sCREEN OR pRI
NTER?
80 B$=INKEY$:IF B$=""THEN 80
90 IF B$="S"THEN Q=0:GOTO 120
100 IF B$="P"THEN Q=-2:GOTO 120
110 GOTO 80
120 CLS:OPEN"I",#1,A$
130 IF B$="S"THEN GOSUB 320
140 IF B$="P"THEN GOSUB 330
150 FORX=1024 TO 1055
160 POKE X,PEEK(X)-64
170 NEXT X
180 PRINT@42,A$
190 IF EOF(1)=-1 THEN CLOSE:GOTO
 250
200 INPUT#1,A$
210 PRINT #Q,A$
220 IF B$="P"THEN 240
230 IF B$="S"THEN GOSUB 300
240 GOTO 190
250 PRINT:PRINT:PRINT"ANOTHER RU
N (Y/N)
260 I$=INKEY$:IF I$=""THEN 260
270 IF I$="Y"THEN RUN
280 IF I$="N"THEN CLS:END
290 GOTO 260
300 IF INKEY$<>CHR$(32) THEN 300
310 RETURN
320 PRINT@0,"  HIT SPACEBAR TO S
EE MORE OF..":RETURN
330 PRINT@0,"   PRINTING OUT CON
TENTS OF...":RETURN
```

CoCo 3 Graphics

A Star Like a Wheel

CoCo 3

By Jim Pruyne

Stars uses CoCo 3's advanced capabilities to animate a spinning star. The program starts by prompting for input of the number of points the star will have. It asks if you want the star outlined, how fast the animation should be, whether you want an inner star inscribed, and how accurate the animation should be. The higher the number you select (up to 15), the smoother the animation.

The animation is accomplished by drawing a number of images of the star in various degrees of rotation, as determined by the accuracy level input. Each image is drawn in a different color, using the PALETTE command set to the background color in order to be invisible. After all images are drawn, the program uses the PALETTE command to display each image in sequence by changing it from the neutral background color to a visible color.

The listing: STARS

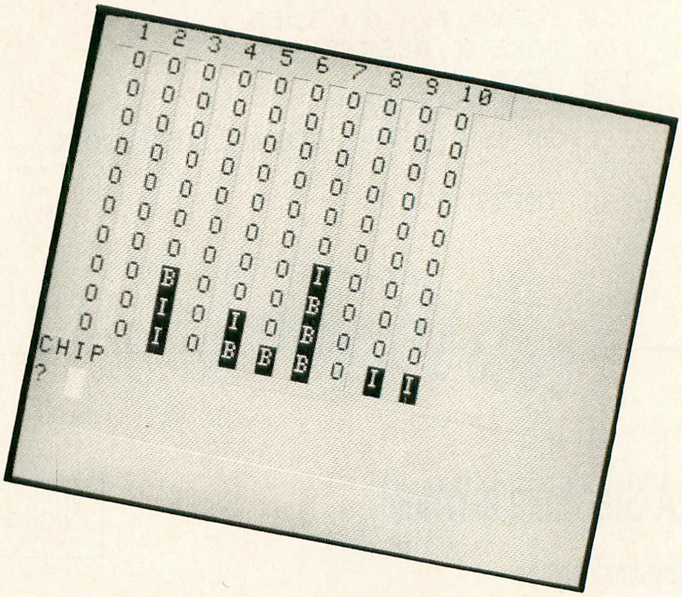
```
10 'ROTATING STAR.   BY JIM PRUY
NE JR.
20 '201 W. SUMMIT, NORMAL IL.
30 'WITH ENCOURAGEMENT FROM MELI
SSA RODRIGO & RICHARD NEWTON
40 POKE 65497,0
50 ON ERR GOTO 410
60 ON BRK GOTO 410
70 PALETTE RGB
80 HSCREEN 0
90 INPUT"POINTS";X
100 INPUT"OUTLINE (Y/N)";O$:O$=L
EFT$(O$,1)
110 INPUT"ROTATE <F>AST OR <S>LO
W";D$:D$=LEFT$(D$,1):IF D$="S" T
HEN D$="P16" ELSE D$=""
120 INPUT"INNER STAR (Y/N)";C$:C
$=LEFT$(C$,1):IF C$="Y" THEN CS=
64 ELSE CS=70
130 INPUT"ACCUARACY (1-15)";AC
140 DIMA(2,X)
150 PI=3.14159265
160 S=2*PI/X
170 F=0
180 PALETTE 0,0
190 HSCREEN 2
200 CD=2/X/AC*PI
210 FOR F1=1 TO AC
220 HCOLOR F1
230 F=F+CD
240 FOR BB=80 TO 15 STEP -CS
250 FOR R=0 TO 2*PI STEP S
260 A(1,R/S)=COS(R+F)*BB+160
270 A(2,R/S)=SIN(R+F)*BB+96
280 NEXT
290 FOR R=0 TO X-1
300 W=R+INT(X/2)+1
310 IF W>X-1 THEN W=W-X
320 HLINE(A(1,R),A(2,R))-(A(1,W)
,A(2,W)),PSET
330 NEXT
340 IF O$<>"Y" THEN 380 ELSE FOR
 R=0 TO X-2
350 HLINE(A(1,R),A(2,R))-(A(1,R+
1),A(2,R+1)),PSET
360 NEXT
370 HLINE(A(1,0),A(2,0))-(A(1,X-
1),A(2,X-1)),PSET
380 NEXT:PALETTE F1,63:NEXT
390 FOR F=1 TO AC:PALETTE F,63:P
LAY D$:PALETTE F,0:IF INKEY$<>""
 THEN 400 ELSE NEXT:GOTO 390
400 PALETTE F,23:A$=INKEY$:IF A$
=" " THEN 390 ELSE IF A$="" THEN
 400 ELSE CLEAR:RUN
410 POKE 65496,0:PALETTE RGB:STO
P
```

Five in a Row

4K

By John James

In *ConFive*, two players take turns dropping letters down one of 10 columns, attempting to get five in a row horizontally, vertically or diagonally. Play continues until a player succeeds in doing so, or until there are no possible moves left.



The listing: CONNECT5

```
2 CLS
3 PRINT"THIS IS CONNECT 5 IN A R
OW FOR  TWO PLAYERS. TRY TO BE T
HE FIRSTTO GET 5 IN A ROW TO WIN
 THE    GAME"
30 FOR X=1 TO1000:NEXT X
40 CLS3
50 DIM A$(10,10)
60 PRINT"JOYSTICK OR KEYBOARD (J
 OR K)";:INPUT K$
70 C=5
80 INPUT"NAMES OF PLAYERS "; NA$
(1),NA$(2)
90 CLS3
100 FOR Y=1 TO 10:PRINT@Y*2-1,Y;
:NEXTY
110 FOR X=1 TO 10
120 FOR Y=1 TO 10
130 A$(X,Y)="O"
140 NEXT Y
150 NEXT X
160 FOR X=1 TO 10
170 FOR Y=1 TO 10
180 PRINT @X*32+Y*2,A$(X,Y);
190 NEXT Y
210 NEXT X
220 PRINT@Y*32,"        ";:PRINT@Y
*32,"";
230 IF C=5 THEN PRINTNA$(1) ELSE
 PRINTNA$(2)
240 IF C=5 THEN C=1 ELSE C=5
250 IF C=5 THEN B$="i" ELSE B$="
b"
260 IF K$="K" THEN 350
270 H=JOYSTK(0):V=JOYSTK(2)
280 IF H<7 OR V<7 THEN 270
290 IF C=1 THEN PRINT@2*INT(H/6.
3),B$;
300 IF C=5 THEN PRINT@2*INT(V/6.
3),B$;
310 TS=PEEK(65280)
320 IF C=5 THEN PRINT@2*INT(V/6.
3)-1,INT(V/6.3);
330 IF C=1 THEN PRINT@2*INT(H/6.
3)-1,INT(H/6.3);
340 IF TS=127 OR TS=255 THEN 270
 ELSE IF C=1 THEN X=H/6.3 ELSE X
=V/6.3
350 IF K$="K" THEN INPUT X
360 IF X>10 OR X<1 THEN PRINT:GO
TO 220
370 FOR G=10 TO 1 STEP -1
380 IF A$(G,X)<>"O" THEN NEXT G
390 IF A$(G,X)="O" THEN A$(G,X)=
B$
400 GOTO 160
```

Submissions to "Novices Niche" are welcome from everyone. We like to run a variety of short programs that can be typed in at one sitting and are useful, educational and fun. Keep in mind, although the short programs are limited in scope, many novice programmers find it enjoyable and quite educational to improve the software written by others.

Program submissions must be on tape or disk. We're sorry, but we cannot key in program listings. All programs should be supported by some editorial commentary, explaining how the program works. If your submission is accepted for publication, the payment rate will be established and agreed upon prior to publication.

Color Connection

by BJ Chambless

This is the most comprehensive modem package for the Color Computer!

All are Protocols Supported including CompuServe Protocol B, XMODEM protocol, and XON/XOFF. **Auto dial** feature for both Hayes compatible and some Radio Shack modems. You can use **all baud rates** when using the Radio Shack Deluxe RS232 program pack! Printer baud rates are selectable.

You can **print from the buffer** and files bigger than the buffer can be uploaded and downloaded. **Download direct to disk** with automatic XON/XOFF protocol! **Single key macros** allow easy entry of often-used passwords and ID's.

Hi-Res screens with a choice of colors are used. All printable characters available and all control characters are supported.

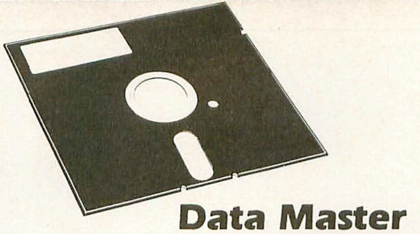
RSDOS Version includes two sets, one for CoCo I and CoCo II, the other for CoCo 3.

OS-9 Connection 3.0:

The package includes all of the features of the RSDOS version plus runs on OS-9! Versions for both Level I and Level II are included. RS232 pak is required.

RSDOS Disk	**$49.95**
OS-9 Disk	**$49.95**

Also available from Radio Shack through Express Order Software



Data Master

by BJ Chambless

Simplify with pull-down menus

All options are available from anywhere in the program. To make it even simpler, each menu option can be invoked by a single character!

Dialog boxes

Pop-up windows display current settings and available choices.

Unique LIST display format

You view data in easy-to-read rows & columns. From this easy-to-read screen you may edit your data, without having to exit. Mass changes are a snap!

For even more power, use an access key to selectively display a subset of records and can change them right on the screen!

Compatibility with OS-9 Profile & Data Bank

You won't lose any of your valuable data!

Easy Expansion

with re-definition of records and transfer of files.

Elements & Records:

Each record can contain up to 512 characters used within 35 elements. Elements are defined as: alphanumeric (descriptive data), math (real numbers including dollars & cents), date, and derived (formulas calculated from other elements in the same record). You can store any type of data using these field types!

Display & Entry Screens

Design up to 9 different screen formats for data display and data entry for each data base. This is helpful for accessing your data for different purposes.

Sorts & Selections:

Up to 9 different access keys can be defined. These are used for displaying data on the screen or selecting data for printing. You may use several levels of sorts as well as logical operators to select just the right data. A powerful generic search is also available.

Reports:

See your data any way you want by designing your own reports! Data Master offers easy-to-use tools to design professional reports including report headings, titles, column headings, automatic page numbers, column totals, and more. Store up to 9 report formats for each data base.

File Management

Built-in file management capabilities allow easy file manipulation for transferring data files, renaming data files, expanding data files, and more.

Upload/Download

Data Master can read and write standard sequential files which aids in data transfer between DynaCalc and many others.

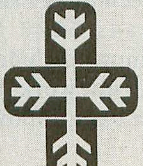
Full keyboard ease

taking full advantage of the CoCo 3's cursor and function keys.

OS-9 accessible

Even while operating within *Data Master.*

Requires OS-9 Level II, CoCo 3, 512K	**$64.95**



Screen Star

by Scott Cabit

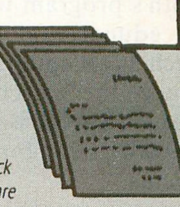
Also available from Radio Shack through Express Order Software

Screen Star implements the popular **WordStar** editing capabilities. If you know WordStar you already know how to use **Screen Star!**

- **Edit files larger than memory** since Screen Star uses the disk as an extension of memory.
- **Block Commands** – with a keystroke you can mark the start and end of a block, then move, copy, or delete the block.
- **Cursor Movement** is easy with an array of commands to move left or right one character, or one word, or one line; scroll forward or back one line, one screen, one block; jump to the start or end of the line or the screen, block, or file.
- **Find & Find/Replace Commands** make mass changes and searches a snap.
- **Pop-Up Help Menus** are as close as a keystroke.
- **Closing Commands** let you exit the editor with or without save, and can import or export files whenever you need them.
- **Smart Speller** is included.
- **Parameter commands** personalize your environment.
- **Access the OS-9 Shell.**
- **Up to 10 functions keys** can be defined by CoCo 3 users for fast, repetitive functions.
- **Use with the Text Formatter** for a full word processing team. Simply imbed the Text Formatter commands in your Screen Star file and it will be printed in style!
- **Level 1 & Level 2** are supported and both versions are included.

Requires OS-9 Disk	**$49.95**
With Text Formatter	**$74.95**

OS-9 Text Formatter



Also available from Radio Shack through Express Order Software

An easy way to get beautiful documents and letters with OS-9, Text Formatter interfaces with any editor that produces standard ASCII text files.

Features include left and right **justification,** page breaks, special spacing, automatic **pagination,** automatic **page numbering, centering, indenting, tabs,** and sending **escape and control codes** to your printer as well as sophisticated **headers and footers.** Special functions include **macros** for often used sequences, relative arguments, upper and lower case modes, *nonprintable remarks, and more!*

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Sentence Savvy

By Fred B. Scerbo
Rainbow Contributing Editor

If you have an idea for the "Wishing Well," submit it to Fred c/o THE RAINBOW. *Remember, keep your ideas specific, and don't forget this is* BASIC. *All programs resulting from your wishes are for your use, but remain the property of the author.*

Hello, readers. Welcome back to another month's effort in meeting your needs and wishes. As usual, you, the reader, serve as the inspiration for these pages by writing in with your ideas. If there is one common thread that runs through nearly all of my mail, it is this one request: "Keep writing more software for the Speech/Sound Pak!"

This is perfectly understandable. When you invest in something like the Speech/Sound Pak, you want it to be more than just a novelty. Therefore, this month's program will be another valuable educational program that uses speech as an option. The program does not need the Speech Pak to be effective, however. Speech is just an extra option, especially nice for use with younger students.

Some of you have written and asked why I do not make these programs work with other speech packs for other dealers. There are two reasons for this. First, I believe that Tandy products for the CoCo have the widest distribution simply by being sold side-by-side with the CoCo. Second, I cannot afford to go out and buy every other dealer's product. If other dealers were to supply me with the hardware, I would gladly make some of my programs compatible with other voice packs. Unless that happens, however, these programs will be designed to work specifically with the Tandy version.

The Program

This month's program is *Sentence Structure: Recognizing Simple Subjects and Predicates.* The purpose of the program is very simple: to familiarize students with simple subjects and predicates while introducing them to sentence diagramming. The program has some features found in other educational programs I have written for "Wishing Well." Other parts are totally new.

Fred Scerbo is a special needs instructor for the North Adams Public Schools in North Adams, Massachusetts. He holds a master's in education and has published some of the first software available for the Color Computer through his software firm, Illustrated Memory Banks.

One of the nice features of the program is that you can easily add up to 50 of your own sentences (in `DATA` statements). You might even want to save different versions of the program with sentences of varying difficulty, building up a small software library.

Most of my other programs have used multiple-choice selection for user responses. This is one of the few programs that has the user actually input the correct answer. The sentence is directly in front of the student, so he or she should be able to input an answer without making a mistake in spelling, in which case the response would be wrong even on a written test.

Sentence Structure shares features found in other "Wishing Well" programs. You can go to the score card any time by pressing the @ key, and you still have the option of continuing once you check the score. You also have the familiar title screen that graces my programs.

Running the Program

On running the program you will see the title screen. Press T or N for the options of Talking or Not Talking. (Make sure your CoCo is turned off before you try to insert the Speech/Sound Pak.)

One nice feature of *Sentence Structure* is that it requires you to read each screen. The program presents a sentence and asks you to type in the simple subject or simple predicate. Sometimes it asks for the sentence's subject first; other times it asks for the predicate first; this helps keep the program from becoming too routine.

After both simple subject and simple predicate have been entered, the program diagrams the sentence onscreen for you. You advance to the next screen by pressing `ENTER`.

No other instructions are needed for the program to run.

Adding Your Own Information

If you want to delete my `DATA` statements, enter `DEL 1000-4999`. You could also choose to add to my data rather than dump it, placing your new `DATA` statements between lines 1080 and 5000. Line 5000 reads `5000 DATA END,END,END`; you must include this line or the program will not work. If you want to add your own data, follow this format:

`1000 DATA` *sentence, simple subject, simple predicate*

Here's an example:

```
1000 DATA JOHN LEFT THE
HOUSE,JOHN,LEFT
```

Be sure to place commas between each piece of information. If you need to use a comma as part of the punctuation, surround each piece of information with quotes:

```
1000 DATA "JOHN, MARY AND BILL
ALL LOVE APPLES.","JOHN, MARY
AND BILL","LOVE"
```

An OD Error means you left out a comma somewhere. Be sure not to delete Line 5000.

After you enter your data, run the program to test it and then save your new program under a different filename, such as `SENT2`.

CoCo 3 Problems

A few of you have written to say that some of my graphics programs do not work properly with the CoCo 3. Now that I have a CoCo 3, I know what you mean. Some of my programs that require a press of the reset button to change the screen color do not work as they should. It seems that the CoCo 3 has a standard color set that does not change with reset. I'll publish some fixes to these problems shortly (please do not ask me for copies in advance by mail). Just be patient — the fix is coming! And keep your cards and letters coming, too! □

40 137
125 186
260 72
335 103
430 188
530 214
END 190

The listing: SENTENCE

```
1 REM *************************
2 REM *  RECOGNIZING SIMPLE   *
3 REM * SUBJECTS & PREDICATES*
4 REM *   BY FRED B.SCERBO    *
5 REM *    60 HARDING AVE.    *
6 REM * NORTH ADAMS,MA 01247 *
7 REM *  COPYRIGHT (C) 1987   *
8 REM *************************
9 CLEAR3000
10 CLS0:FORI=1TO64:PRINTCHR$(156
);:NEXT
15 FORI=1TO192:READA:PRINTCHR$(A
+128);:NEXT
20 DATA126,124,124,120,53,60,60,
53,60,56,59,48,58,60,61,60,56,62
,60,53,50,53,53,60,60,53,60,56,1
12,126,124,124
25 DATA122,,,,52,60,61,53,56,,58
,57,58,,53,,48,62,48,53,52,55,53
,,,53,56,,112,122,,
30 DATA123,115,115,114,52,60,60,
52,60,56,56,,56,,52,,48,60,60,52
,48,52,52,60,60,52,60,56,112,123
,115,115
35 DATA80,,80,122,124,125,124,12
0,126,124,122,122,80,117,117,124
,124,124,116,124,126,124,117,80,
80,122,126,124,122,122,112,112
40 DATA80,80,80,122,80,117,80,80
,126,126,120,122,80,117,117,80,8
0,80,80,80,122,80,117,80,,122,12
6,126,120,122,,80
45 DATA123,115,115,122,80,117,11
2,,122,116,114,123,115,119,117,1
15,115,115,112,80,122,,117,115,1
15,122,122,116,114,123,115,115
50 FORI=1TO64:PRINTCHR$(147);:NE
XT
55 PRINT@357," RECOGNIZING SIMP
LE   ";:PRINT@389," SUBJECTS & P
REDICATES ";:PRINT@421," (T)ALKI
NG OR (N)OT ? ";
60 PRINT@453,"   BY FRED B.SCERB
O    ";
65 PRINT@485,"  COPYRIGHT (C) 19
87   ";
70 X$=INKEY$:XX=RND(-TIMER):IFX$
="T"THEN90
75 IFX$="N"THEN85
80 GOTO70
85 NT=1:GOTO150
90 CLS0
95 XX=&HFF00:YY=&HFF7E
100 POKEXX+1,52:POKEXX+3,63
105 POKEXX+35,60:GOTO150
110 IFNT=1THENRETURN
115 FORII=1TOLEN(AA$)
120 IF PEEK(YY)AND 128=0 THEN120
125 POKEYY,ASC(MID$(AA$,II,1))
130 NEXTII
135 IFPEEK(YY)AND128=0THEN135
140 POKEYY,13
145 FORI=1TO1000:NEXT:RETURN
150 SW=31
155 CLS0
160 DIMAO(50),A$(50),SS$(50),SP$
(50),NP(50)
165 CLS0:GOTO205
170 AA$=JK$:GOSUB110
175 IF LEN(JK$)<=SW THEN195
180 FOR T=SW TO 0STEP-1:IF MID$(
JK$,T,1)=" "THEN190
185 NEXT T:GOTO195
190 L$=LEFT$(JK$,T):W$=L$:GOSUB2
00:JK$="   "+RIGHT$(JK$,(LEN(JK$
))-T):GOTO175
195 W$=JK$:PRINTW$:RETURN
200 PRINTW$:RETURN
205 FORJ=1TO50:READ A$(J),SS$(J)
,SP$(J):IF A$(J)="END" THEN215
210 NEXTJ
215 REM START QUIZ
220 J=J-1:FORI=1 TO J
225 AO(I)=RND(J)
230 IF NP(AO(I))=1 THEN 225
235 NP(AO(I))=1:NEXTI
240 FOR Y=1TO1000:NEXTY
245 GOTO395
250 CLS
255 PRINT@35,"HERE IS EXAMPLE NU
MBER";P
260 RETURN
265 AA$="   WHAT IS THE SIMPLE S
UBJECT    OF THIS SENTENCE ?":
:GOSUB110:PRINT@96,AA$
270 PRINT@192,"";:JK$="   "+A$(A
O(P)):GOSUB170
275 PRINT:PRINT"   => ";:LINEINP
```

```
UTA$
280 IFA$="@"THENGOSUB480
285 IF FX=1 THEN RETURN
290 IF A$<>SS$(AO(P))THEN305
295 PRINT:JK$="   YOU ARE CORREC
T! THE SIMPLE SUBJECT IS: "+SS$(
AO(P)):GOSUB170
300 CR=CR+1:GOTO315
305 PRINT:JK$="   WRONG! THE COR
RECT SIMPLE SUBJECT IS: "+SS$(AO
(P)):GOSUB170
310 IR=IR+1
315 GOSUB475
320 X$=INKEY$:IFX$<>CHR$(13)THEN
320
325 RETURN
330 AA$="    WHAT IS THE SIMPLE
          PREDICATE OF THIS SE
NTENCE ?":GOSUB110:PRINT@96,AA$
335 PRINT@192,"";:JK$="   "+A$(A
O(P)):GOSUB170
340 PRINT:PRINT"    => ";:LINEINP
UTA$
345 IFA$="@"THENGOSUB480
350 IF FX=1 THEN RETURN
355 IF A$<>SP$(AO(P))THEN370
360 PRINT:JK$="   YOU ARE CORREC
T! THE SIMPLE PREDICATE IS: "+SP
$(AO(P)):GOSUB170
365 CR=CR+1:GOTO380
370 PRINT:JK$="   SORRY! THE COR
RECT SIMPLE PREDICATE IS: "+SP$(
AO(P)):GOSUB170
375 IR=IR+1
380 GOSUB475
385 X$=INKEY$:IFX$<>CHR$(13)THEN
385
390 RETURN
395 FORP=1TOJ
400 WW=RND(2):IFWW=1THEN410
405 FX=0:GOSUB250:GOSUB265:GOSUB
250:GOSUB330:GOTO415
410 FX=0:GOSUB250:GOSUB330:GOSUB
250:GOSUB265
415 CLS:JK$="   HERE IS HOW WE W
OULD DIAGRAM THE SIMPLE SUBJECT
AND THE SIMPLE PREDICATE.":PRINT
@32,"";:GOSUB170
420 PRINT:JJ=LEN(SS$(AO(P))):PRI
NTSTRING$(JJ+6,32);CHR$(133)
425 PRINT"     "SS$(AO(P));" "CH
R$(133)" ";SP$(AO(P))
430 PRINT"   "STRING$(26,131)
435 PRINT@230+JJ,CHR$(129);
440 PRINT@262+JJ,CHR$(133)
445 PRINT@320," SIMPLE          SI
MPLE"
450 PRINT" SUBJECT         PREDICA
TE"
455 GOSUB475
460 X$=INKEY$:IFX$<>CHR$(13)THEN
460
465 NEXT P
470 GOSUB480:RUN
475 PRINT@483," PRESS <ENTER> TO
 CONTINUE";:RETURN
480 CLS:PRINT:PRINT:PRINT
485 PQ=CR+IR:IF PQ=0THEN PQ=1
490 PRINT"    NUMBER CORRECT = "
CR
495 PRINT
500 PRINT"    NUMBER WRONG    = "
IR
505 PRINT:PRINT"    STUDENT SCOR
E  = ";INT(CR*100/PQ);"%"
510 PRINT:PRINT"    ANOTHER TRY
(Y/N/C)";
515 W$=INKEY$:IF W$=""THEN515
520 IF W$="C" THEN FX=1:RETURN
525 IF W$="Y" THEN RUN
530 IF W$="N" THEN CLS:END
535 GOTO515
990 REM ENTER DATA AT LINE 1000
1000 DATA AROUND HER HEAD SHE WO
RE A YELLOW RIBBON.,SHE,WORE
1010 DATA IT LOOKS LIKE IT IS GO
ING TO RAIN.,IT,LOOKS
1020 DATA I WILL BE LEAVING WHEN
 THE SUN COMES OUT.,I,WILL BE LE
AVING
1030 DATA GET ME A PLATE OF THAT
 PASTA WITH MEATBALLS.,YOU,GET
1040 FIVE TIRED MEN PLODDED ACRO
SS THE MUDDY FIELD.,MEN,PLODDED
1050 DATA THE SIGHT OF THE TOWN
IN THE DISTANCE GAVE THEM HOPE.,
SIGHT,GAVE
1060 DATA HE WAS WEARING A PINK
SHIRT.,HE,WAS WEARING
1070 DATA WE SAW HER DANCING ALL
 NIGHT LONG.,WE,SAW
1080 DATA MUCH FRUIT GROWS RAPID
LY IN THE SUNNY VALLEY DOWN SOUT
H.,FRUIT,GROWS
1090 DATA THOSE EXPENSIVE JEWELS
 IN THE WINDOW ARE NOT FOR YOU.,
JEWELS,ARE
5000 DATA END,END,END
```

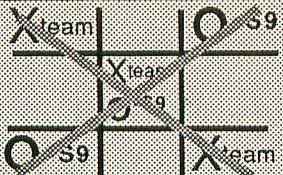
Hint . . .

Revving Up Your Tape System

Are you running a tape-based CoCo 3 system? Would you like to speed things up? I thought so. It is possible to use the high-speed poke with a tape-based CoCo 3. Just enter `POKE 65497,0` before saving your program to, and loading from, tape. If you do this, make sure you are using the highest quality tape you can find. The increased speed during I/O can cause problems if you don't.

George Ellenburg
Edgewood, FL

XTEAM & OS-9



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The final installment of a four-part programming tutorial

BASIC for Beginners

Lesson IV

By David W. Ostler

In "BASIC for Beginners: Lesson III" [February 1988, Page 20], I left you with a programming exercise. There are many solutions. Those of you who want to see what one possible solution looks like, just examine the listing of `DATABASE`, which accompanied "Lesson III."

Well, this is the final installment in the series. I hope I've helped you to develop your programming skills, or have helped you to better understand how commands work. Again I stress that we have not covered all the commands the Color Computer uses, but we have touched on many of the more common commands. To learn more about programming, keep reading THE RAINBOW and studying the manuals that accompany your computer.

This month we put the finishing touches on our database program, adding disk and tape I/O and enhancing some of the program's features.

Because the program has become rather intricate, I've included a line-by-line breakdown of this month's additions. (For a line-by-line description of the rest of the program, see Page 24 of February's "Lesson III.")

The best way to understand and plan a complicated program is to break it into blocks, identifying them by `REM` statements. Or you can mark the blocks' functions on a hard copy of the program. Use these methods to write your programs and keep the program functions straight in your mind.

OPEN

The `OPEN` command opens up a file on disk, tape or RAM memory for input/output (I/O) operations. This command can also name the file, establish length and define the device to be used.

Proper syntax for this command is `OPEN"X$",Y,A$`, where `X$` is either I

Dave Ostler is an IC layout designer and the systems manager for a CAD mainframe system. He teaches CAD and electronics at Guilford Technical Community College. Dave is married and has three children, Avis, Chuck and Erik.

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(See June '87 review)

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or O, for input or output, respectively. Y is the device to be opened, and A$ is the filename of the file to be accessed. An example of the use of the OPEN command is OPEN"I",1,DATA/PRG, which opens a file named DATA/PRG for loading of data into the computer. The device used for "input from" is the disk drive. Note that I represents *input from* and O represents *output to*.

The following are device specifiers, which should be used in place of the Y for determining the device for I/O "to" or "from":

Device	Specifier
Disk	1
Tape	-1
Printer	-2
Keyboard	0

EOF

The EOF command detects when an "End Of File" has been reached, and is always used in an IF/THEN format.

The proper syntax for this command is IF EOF (*x*) THEN *xxxx*, or IF EOF (*x*) THEN CLOSE, where *x* is the End Of File indicator and *xxxx* is the line number in the program where the program should go if an End Of File has been detected. Note that the command line reads, "If End Of File is *x* then go to *xxxx*, or if End Of File is *x* then close file." The End Of File indicators are listed as follows. These numbers indi-

Line	Description
500	sets N equal to zero, clears the screen and allows the input of string variable A$, which is the name of the file to be used for data I/O.
502	tests to see if there has been an entry for string variable A$; if there has been no entry then the program will return to Line 2000.
505-520	test the value of variable A to see whether the system is tape or disk.
540	a remarked line.
545	opens an input file to the cassette with the name found in A$, which was entered in Line 500.
550	checks to see if the End Of File has been reached. If it detects an EOF condition, it will jump to Line 560. If no EOF condition has been detected, the program will then go to the next line, which is Line 552.
552	inputs data from the cassette drive. Please note that this data has dimensioned variable labels, each variable related to the dimension variable label N.
553	adds one count to the dimension variable label N. The computer does not care whether the data comes from the keyboard, tape drive or disk drive — it treats all the data the same way.
554	forces a jump to Line 550 to test for an EOF condition.
555	properly closes the file that was opened in Line 545.
560	forces a jump to Line 900.
565	a remarked line.
567	opens an input file to the disk drive with the name found in A$.
568	checks to see if the End Of File has been reached. If it detects an EOF condition, it will jump to Line 580. If no EOF condition has been detected, the program will then go to the next line, which is Line 572.
572	inputs data from the disk drive. This data has dimensioned variable labels, each variable related to the dimension variable label N.
573	adds one count to the dimension variable label N.
579	forces a jump to Line 568 to test for an EOF condition.
580	properly closes the file that was opened in Line 567.
590	forces a jump to Line 900.
600	clears the screen and allows the entry of string variable A$.
602	sets a new value for A$ equal to the old value of A$ entered in Line 600. This is done to avoid any file errors that may occur due to too many characters being used in the filename. Remember that your computer recognizes only filenames of a maximum eight characters long with a three-character extension. The extension is a label placed on the program name that tells the computer what type of program is being loaded or saved. See your manuals for more information on filenames and extensions.
605-620	test the value of variable A to see whether the system is tape or disk.
650	a remarked line.
655	opens an output file to the cassette drive with the name found in A$.
660	sets a FOR/NEXT command with the value of variable Z to be set from zero to the value of N-1. (The reason for this is that if we left the value for zero to N, we would have a blank file left at the end of the data file when we saved the data file to disk or tape. This would use up data space and not allow us to make the most of our data space available.
661	prints data to the cassette drive. These variables are printed as they relate to the variable label Z. The program then adds 1 to the value of Z and causes the program to go back to Line 660 to start the next count of the FOR/NEXT loop set up in Line 660. When the count conditions are satisfied for the FOR/NEXT loop, the line will then properly close the file opened in Line 655 and force a jump to Line 2000, which is the menu selection area.
675	a remarked line.
680	opens an output file to the disk drive with the name found in A$.
682	sets a FOR/NEXT command with the value of Z to be set from 0 to the value of N-1.
684	prints data to the disk drive.

cate that an End Of File condition has been detected:

Device	Indicator
Disk	1
Tape	-1

CLOSE

The `CLOSE` command properly terminates any file that was previously opened. Failure to properly terminate open files will result in an FD Error (bad file data). These files may or may not be recoverable; usually they are lost and all data contained in them is lost, as well. Sometimes you can recover it by repairing the files or by using a disk repair utility to look at the data and print it out.

If for any reason you interrupt a program that has previously opened a file, or you suspect a file has been left open, type `CLOSE` and press `ENTER`. This command will then properly terminate any file that might have been left open. This can be done after a break or error; be sure to enter the command *before* a reset, cold poke or warm start has occurred.

Proper syntax for this command is `CLOSE`, `CLOSE`*x*, where *x* is the proper device specifier or any other form that adds the proper device specifier on the end of the command.

Line	Description
685	adds 1 to the value of `Z` and causes the program to go back to Line 682 to start the next count of the `FOR/NEXT` loop set up in Line 682. When the count conditions are satisfied for the `FOR/NEXT` loop, it goes on to Line 686.
686	properly closes the file opened in Line 680.
687	forces a jump to Line 2000.
700-770	print out the string variables `B$`, `C$`, `D$` and `E$`, and allow you to select which one to correct.
880	clears the screen and allows the entry of `B$` as it is related to `Z`. It will be used for a new value for `B$` as related to `N`.
801	sets `B$(N)` equal to the same character values as `B$(Z)`; forces a jump to Line 700.
810-831	perform the same operations for entering and changing variables `C$`, `D$` and `E$`, and then force a jump to Line 700.
900	sets up a `FOR/NEXT` value for `B`. (As explained for lines 660 and 682, when displaying or printing variables entered in arrays, you must use the variable used in counting the array, which, in this case, is `N` minus 1. This counts down the variable. To fail to do so will cause a blank file to be displayed.
910-940	display text with associated variables as they relate to `B`.
950	prints text at the specified location.
960	sets `I$` to an `INKEY$` function and will continue to Line 970 if any key is pressed.

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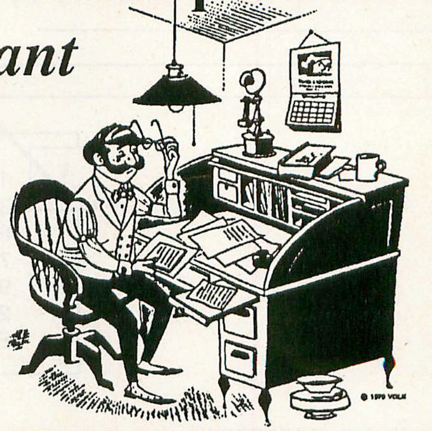

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PRINT#

The `PRINT#`*x* command prints the characters following this command to the device specified. The device specifiers used for the `PRINT#`*x* command are the same ones used for the `OPEN` command.

Proper syntax for this command is `PRINT#-1` for the cassette drive, `PRINT#-2` for the printer, `PRINT#1` for the disk drive, or `PRINTA$`, where `A$` is the proper device specifier as determined in the program.

LEFT$

This command allows you to select the left string of characters within a specified string of characters. It is useful in various text data manipulations.

The proper syntax for this command is `B$ = LEFT$(A$,`*x*`)`, where `B$` is the new character string to be defined, `A$` is the text string to be manipulated and *x* equals the number of characters to use in the length of the string manipulation (a number from 1 to 255). A common practice is to use the same string variable for the manipulation. This can be accomplished by the command `A$ = LEFT$(A$,8)`, which reads, "String variable `A$` has a new value of the old value of `A$`, but only the first eight characters on the left of the old value of `A$`."

Block	Lines	Label
1	0-85	Setup
3	95-220	Data Input
3A	300-330	Entry Error Correction
5	500-520	Output Device Setup
5A	540-560	Cassette Input
5B	565-590	Disk Input
6	600-620	Input Device Setup
6A	650-661	Cassette Output
6B	675-687	Disk Output
4A	700-831	Editor
4	900-980	Text Display
1A	1000-1200	System Type Display
2	2000-2010	Main Menu
7	5000	Program End Routine
3B	6000	Maximum File Size Routine

Figure 1

We will not go into the other string manipulation commands.

The Program

I mentioned earlier the method of "blocking off" your program, in which you take a hard copy of it and physically draw lines between distinct routines. You then label each routine, explaining its function. This makes the program much more understandable to you and to anyone else who looks at the listing. I blocked off the final version of `DATABASE` as shown in Figure 1.

Well, I guess this is it. We have covered many of BASIC's commands and have developed a small database program. The database is rather crude; I left it that way so you could practice the skills you have learned in this series. You can use what you have learned to enhance the database program, perhaps adding a feature that allows adding more data to an existing database, increasing the array sizes, etc.

(Questions or comments regarding this tutorial may be directed to the author at 901 Ferndale Blvd., High Point, NC 27260. Please enclose an SASE when writing for a reply.) ☐

140	116
310	18
600	147
740	118
920	38
2000	66
END	12

The listing: `DATABASE`

```
0 'BASIC NAME DATABASE PROGRAM.
THIS PROGRAM IS TO BE USED WITH
THE BASIC PROGRAMMING COURSE
WRITTEN BY DAVID W. OSTLER, COPY
RIGHT 1987
10 CLEAR1000:T=100:N=0:DIMB$(10)
:DIMC$(10):DIMD$(10):DIME$(10)
20 'CHECK FOR TAPE OR DISK SYSTE
M
30 A=PEEK(188)
40 'CHECK FOR 16K OR 64K SYSTEM
50 B=PEEK(116)
60 IF(A=14 AND B=127) THEN GOSUB
1000
70 IF(A=6 AND B=127) THEN GOSUB1
010
80 IF(A=6 AND B=63) THEN GOSUB10
20
85 GOTO2000
95 'FILES ENTERED HERE
100 CLS:PRINT"ADDRESS DATABASE #
 OF FILES";N:PRINT:LINEINPUT"ENT
ER NAME
        ";B$(N)
110 PRINT:LINEINPUT"ENTER ADDRES
S
";C$(N)
120 PRINT:LINEINPUT"ENTER CITY,
ST, &ZIP                   ";D$(N)
130 PRINT:LINEINPUT"ENTER TELEPH
ONE NO.
";E$(N)
140 CLS:PRINT:PRINT"1. NAME- ";B
$(N)
150 PRINT:PRINT"2. STREET-";C$(N
)
160 PRINT:PRINT"3. STATE- ";D$(N
)
```

```
170 PRINT:PRINT"4. PHONE- ";E$(N
)
180 PRINT@357,"PRESS <C> TO CONT
INUE":PRINT@399,"OR":PRINT@416,"
  PRESS THE NUMBER TO CORRECT"
190 I$=INKEY$:IFI$=""THEN190ELSE
IFI$="1"THEN300ELSEIFI$="2"THEN3
10ELSEIFI$="3"THEN320ELSEIFI$="4
"THEN330ELSEIFI$="C"THEN200ELSE1
90
200 N=N+1:IFN=11GOTO6000
210 CLS:PRINT@456,"ANOTHER ENTRY
 (Y/N)"
220 I$=INKEY$:IFI$=""THEN220ELSE
IFI$="Y"THEN100ELSEIFI$="N"THEN9
00ELSE220
300 CLS:PRINT:PRINT:LINEINPUT"EN
TER NAME
        ";B$(N):GOTO140
310 CLS:PRINT:PRINT:LINEINPUT"EN
TER ADDRESS
            ";C$(N):GOTO140
320 CLS:PRINT:LINEINPUT"3. STATE
- ";D$(N):GOTO140
330 CLS:PRINT:PRINT:LINEINPUT"EN
TER TELEPHONE NO.
            ";E$(N):GOTO140
500 N=0:CLS:INPUT"ENTER NAME OF
FILE TO BE LOADED";A$
502 IFA$=""THEN2000
505 'CHECK FOR DISK OR TAPE
510 IFA=6THEN545
520 IFA=14THEN565
540 'CASSETTE TAPE READ IN
545 OPEN"I",-1,A$
550 IF EOF (-1) THEN 560
552 INPUT#-1,B$(N),C$(N),D$(N),E
$(N)
553 N=N+1
554 GOTO550
555 CLOSE
560 GOTO900
565 'DISK SYSTEM READ IN
567 OPEN"I",1,A$
568 IF EOF (1) THEN 580
572 INPUT#1,B$(N),C$(N),D$(N),E$
(N)
573 N=N+1
579 GOTO568
580 CLOSE
590 GOTO900
600 CLS:INPUT"ENTER NAME OF FILE
 TO BE SAVED";A$
602 A$=LEFT$(A$,8)
605 'CHECK FOR DISK OR TAPE
610 IFA=6THEN650
620 IFA=14THEN675
650 'CASSETTE TAPE SAVE
655 OPEN"O",-1,A$
660 FORZ=0 TO N-1
661 PRINT#-1,B$(Z);",";C$(Z);","
;D$(Z);",";E$(Z);",";
662 NEXTZ
```

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```
663 CLOSE
664 GOTO2000
675 'DISK SYSTEM SAVE
680 OPEN"O",1,A$
682 FORZ=0 TO N-1
684 PRINT#1,B$(Z);",";C$(Z);",";
D$(Z);",";E$(Z);",";
685 NEXTZ
686 CLOSE
687 GOTO2000
700 CLS:PRINT:PRINT"1. NAME- ";B
$(Z)
710 PRINT:PRINT"2. STREET-";C$(Z
)
720 PRINT:PRINT"3. STATE- ";D$(Z
)
740 PRINT:PRINT"4. PHONE- ";E$(Z
)
750 PRINT@357,"PRESS <C> TO CONT
INUE":PRINT@399,"OR":PRINT@416,"
  PRESS THE NUMBER TO CORRECT"
770 I$=INKEY$:IFI$=""THEN770ELSE
IFI$="1"THEN800ELSEIFI$="2"THEN8
10ELSEIFI$="3"THEN820ELSEIFI$="4
"THEN830ELSEIFI$="C"THEN970ELSE7
70
800 CLS:PRINT:PRINT:LINEINPUT"EN
TER NAME
       ";B$(Z)
801 B$(N)=B$(Z):GOTO700
810 CLS:PRINT:PRINT:LINEINPUT"EN
TER ADDRESS
          ";C$(Z)
811 C$(N)=C$(Z):GOTO700
820 CLS:PRINT:LINEINPUT"3. STATE
- ";D$(Z)
821 D$(N)=D$(Z):GOTO700
830 CLS:PRINT:PRINT:LINEINPUT"EN
TER TELEPHONE NO.
          ";E$(Z)
831 E$(N)=E$(Z):GOTO700
900 FORZ=0TO N-1
910 CLS:PRINT:PRINT"1. NAME- ";B
$(Z)
920 PRINT:PRINT"2. STREET-";C$(Z
)
930 PRINT:PRINT"3. STATE- ";D$(Z
)
940 PRINT:PRINT"4. PHONE- ";E$(Z
)
950 PRINT@320,"     PRESS [C] TO
CONTINUE,          [R] TO RETURN T
O MAIN MENU,":PRINT@399,"OR":PRI
NT@422,"[E] TO EDIT ENTRY"
960 I$=INKEY$:IFI$=""THEN960ELSE
IFI$="C"THEN970ELSEIFI$="R"THEN2
000ELSEIFI$="E"THEN700ELSE960
970 NEXTZ
980 GOTO2000
1000 CLS0:PRINT@230,"32/64K DISK
 SYSTEM";:FORX=1TO1000STEP1:NEXT
X:RETURN
1010 CLS0:PRINT@228,"32/64K CASS
ETTE SYSTEM";:FORX=1T01000STEP1:
NEXTX:RETURN
1020 CLS0:PRINT@229,"16K CASSETT
E SYSTEM";:FORX=1TO1000STEP1:NEX
TX:RETURN
2000 CLS0:PRINT@32," WELCOME TO
THE BASIC DATABASE ";:PRINT@71,"
WOULD YOU LIKE TO:";:PRINT@133,"
B)EGIN A NEW DATABASE";:PRINT@19
7,"A)BORT THIS PROGRAM";
2005 PRINT@261,"L)OAD A NEW DATA
BASE";:PRINT@325,"S)AVE THIS DAT
ABASE";:PRINT@389,"V)IEW THE DAT
ABASE";:PRINT@458,"[SELECT ONE]"
;
2010 I$=INKEY$:IFI$=""THEN2010EL
SEIFI$="B"THEN95ELSEIFI$="A"THEN
5000ELSEIFI$="L"THEN500ELSEIFI$=
"S"THEN600ELSEIFI$="V"THEN900ELS
E2010
5000 CLS3:PRINT@224,"       REBO
OTING TO BASIC":SOUND200,2:SOUND
100,3:FORX=1TO1000STEP1:NEXTX:CL
S:END
6000 CLS0:PRINT@224,"    MAXIMUM
FILE SIZE REACHED":SOUND200,2:SO
UND100,3:FORX=1TO1000STEP1:NEXTX
:GOTO900
```

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RAINBOW CERTIFICATION SEAL

Fun With Phonics

By Steve Blyn
Rainbow Contributing Editor

This month's program is for the younger set, specifically for children who are just beginning to read words. To them we present *Phonics*, our version of a phonics wheel.

When a child begins to read, initial consonant sounds that represent familiar objects are learned first — "B is for boy" and "C is for Cat," for example. Next, final consonants are taught. For example, the word *bed* ends in D and *car* ends in R.

The short vowel sounds are taught next, and with them, children can practice and learn a great variety of three-letter words. Our program generates an endless variety of three-letter words for children to practice reading.

Supervision by an adult is needed with *Phonics* to first help and later reinforce a child's reading of the words. A child should not be left alone with this program until he or she becomes quite familiar with the material.

Words are chosen randomly and without any regard as to whether they are indeed real words, which is in keeping with our philosophy of teaching reading. We feel it is important to learn to read nonsensical three-letter words because they often form the beginning, middle or end of larger real words. For example, although *til* is not a real word, it is the beginning of *tilt*, the middle of *still* and the end of *until*, which are all common words that will be learned in the near future.

Adults may also ask the child whether a three-letter word is a real word, part of a longer word or just nonsense. At this age, children are often very happy with a little nonsense. It adds some fun to the hard work of learning to read.

We felt that the program should go one step further in the reading process, and so included as an option the "Magic E." The Magic E is a final E, which makes the preceding vowel sound long instead of short: Four-letter words ending in E are the next step in the reading process. Words such as *bit* and *mat* become *bite* and *mate* when the E is added. The rule taught here is that the long sound of the vowel is said but the E at the end is silent.

Each time a child presses 3 on the keyboard, the letter wheels "spin" and the child will be shown a three-letter word. Pressing 4 instead produces a four-letter word with a silent E at the end. No other regular key will operate except the 9 key, which ends the program.

The program is very short and straightforward. Lines 40 through 70 dimension and read the letters. You may choose to leave these as they are or adjust the letter choice for your child. For example, you may choose to stress certain beginning consonant sounds only or the family of words ending in *at* or *et*. The choice of letters used can easily be altered as the child progresses.

Lines 90 through 120 draw a box to surround the word. Lines 180 through 210 print a random word inside the box. After each word is printed, the child may press either the ENTER key for another word or the 9 key to end the program.

Our youngest child, Shari, is 6 years old. We recently bought her a plastic phonics wheel to reinforce her word-reading skills. She enjoys it but often finds it hard to manipulate the wheels. My wife, Cheryl, challenged me to create a similar wheel on the computer. The result is the program presented this month. Shari loves to think of the larger words the nonsense words are part of (she is very smart), and she enjoys the computer wheels more than she does the plastic ones. We hope your youngsters enjoy the program, too. ☐

Steve Blyn teaches both exceptional and gifted children, holds two master's degrees and has won awards for the design of programs to aid the handicapped. He owns Computer Island and lives in Staten Island, New York.

The listing: PHONICS

```
10 REM"PHONICS WHEELS"
20 REM"STEVE BLYN,COMPUTER ISLAN
D,STATEN ISLAND,NY,1988"
30 CLS5:R=17:R1=5:R2=17
40 DIM A$(R),B$(R1),C$(R2)
50 FOR X=1 TO 17:READ A$(X):NEXT
 X
60 FOR Y=1 TO 5:READ B$(Y):NEXT
Y
70 FOR Z= 1 TO 17:READ C$(Z):NEX
T Z
80 CLS RND(5)+1
90 FOR T=1160 TO 1175:POKE T,255
:NEXT T
100 POKE 1207,255:POKE1239,255:P
OKE 1271,255
110 FOR T=1288 TO 1303:POKE T,25
5:NEXT T
120 POKE 1256,255:POKE 1224,255:
POKE 1192,255
130 EN$=INKEY$
140 IF EN$="3" THEN 150 ELSE IF
EN$="4" THEN 150 ELSE 130
150 FOR T= 1 TO 10
160 A=RND(R):B=RND(R1):C=RND(R2)
170 PLAY"O3L50;C"
180 PRINT@204,A$(A);
190 PRINT@206,B$(B);
200 PRINT@208,C$(C);:NEXT T
210 IF EN$="4" THEN PRINT@210,"E
";
220 EN$=INKEY$
230 IF EN$="9" THEN END ELSE IF
EN$=CHR$(13) THEN 80 ELSE 220
240 DATA B,D,F,G,H,J,K,L,M,N,P,R
,S,T,V,W,Z,A,E,I,O,U
250 DATA B,D,F,G,H,J,K,L,M,N,P,R
,S,T,V,W,Z
```

RAINBOW

Give us your best: Join the ranks of these courageous CoCoists in showing the Color Computer world your high score at your favorite micro-diversion. We want to put your best effort on record in THE RAINBOW's "Scoreboard" column. All entries must be received 60 days prior to publication. Entries should be printed — legibly — and must include your *full* name, address, game title, company name and, of course, your high score. Each individual is limited to three score entries per month. Send your entries to Scoreboard, c/o THE RAINBOW.

For greater convenience, your high scores may also be sent to us through the MAIL section of our Delphi CoCo SIG. From the CoCo SIG> prompt, pick MAIL, then type `SEND` and address to: `EDITORS`.

★ Current Record Holder ● Shutout

ADVANCED STAR*TRENCH (THE RAINBOW, 7/86)

4,750	★Stephane Martel, Laval, Quebec
4,300	Jeffrey Warren, Waynesville, NC
3,975	David Schaller, Clarkston, WA
3,960	Maurice MacGarvey, Dawson Creek, British Columbia
3,960	Robbi Smith, Helena, HI

ALPINE SLOPES (THE RAINBOW, 12/85)

13,140	★Ron Silvestro, Lindenwold, NJ
9,880	Walter Schilling, Lindenwold, NJ
7,340	Gary Demerest, Lindenwold, NJ
6,110	Rick McElroy, Lindenwold, NJ

BEE ZAPPER (THE RAINBOW, 9/87)

9,650	★Benoit Landry, Drummondville, Quebec
9,450	Phillip Holsten, Modesto, CA

BUZZARD BAIT *(Tom Mix)*

22,931,850	★Skip Taday, East Lyme, CT
763,550	Geran Stalker, Rivordalo, GA
187,750	Keith Janas, Kitwanga, British Columbia

CANYON CLIMBER *(Radio Shack)*

1,627,500	★Matthew Fumich, Munford, TN
202,000	David Brown, New Waterford, Nova Scotia
178,200	Darren King, Yorkton, Saskatchewan
169,000	Gregory Speer, Emporia, KS
165,500	Sara Mittelstaedt, Kiel, WI
159,200	Upton Thomas, Arnold, MD
150,200	Brian Lewis, Baltimore, MD
141,400	Michael Petry, Kansas, AL
135,600	Eric Rose, Grand Coulee, WA
130,400	Joanna Wanagel, Freeville, NY

CLOWNS & BALLOONS *(Radio Shack)*

688,960	★Faye Keefer, Augusta, GA
70,180	Charles Andrews, Delta Jct, AK
36,650	Melody Webb, Lakeport, CA
15,950	Matthew Smith, Courtenay, British Columbia

COLOR POKER (THE RAINBOW, 4/83)

21,504,600	★Earl Foster, Lynchburg, VA

CRYSTLE CASTLES *(ThunderVision)*

554,979	★Patrick Martel, Laval, Quebec
60,107	Alphonse Brown, Houston, TX

DALLAS QUEST *(Radio Shack)*

81	★Brad Wilson, Lithia Springs, GA
85	David and Shirley Johnson, Leicester, NC
86	Roy Grant, Toledo, OH
86	Melanie Moor, Florence, AL
86	Paul Summers, Orange Park, FL
87	Douglas Bell, Duncan, OK
89	Chris Piche, White Rock, British Columbia
89	Milan Parekh, Fullerton, CA
89	Andrew Urquhart, Metairie, LA
89	Steve Zemaitis, Howell, MI
91	John Semonin, Akron, OH

DECATHALON *(Spectral Associates)*

10,400	★Tom DiVittorio, Glassboro, NJ
7,440	Wayne Hufford, Kincardine, Ontario
7,216	Martin Parada, Arcadia, CA

DEFENSE *(Spectral Associates)*

16,305	★Patrick Martel, Laval, Quebec

DEF MOV (THE RAINBOW, 1/87)

30,253	★Benoit Landry, Drummondville, Quebec
25,739	John Weaver, Amsterdam, NY

DEMOLITION DERBY *(Radio Shack)*

100,100	★Gary Budzak, Westerville, OH
32,000	Darren Lowe, White Rock, British Columbia

DEMON ATTACK *(Imagic)*

72,410	★Glenn Hodgson, Aberdeenshire, Scotland
40,435	Upton Thomas, Arnold, MD
28,780	Daniel Streidt, Cairo, Egypt
16,995	Todd VanNatta, Isle of Palms, SC
4,960	Laundre Clemon, Sacramento, CA

DESERT PATROL *(Arcade Animation)*

377,050	★Jason Lakes, Franklin, OH

DESERT RIDER *(Radio Shack)*

50,797	★Patrick Devitt, Lombard, IL
26,125	Ryan Grady, Newbury Park, CA
24,355	Roby Janssen, Clear Lake, IA

DEVIL ASSAULT *(Tom Mix)*

1,866,100	★Stephane Martel, Laval, Quebec
623,550	Dale Krueger, Maple Ridge, British Columbia
75,000	Blake Cadmus, Reading, PA
40,800	Benoit Landry, Drummondville, Quebec

DISCRIMINATION (THE RAINBOW, 1/87)

15	★Patrick Martel, Laval, Quebec

DONPAN *(Radio Shack)*

52,600	★Eric Olson, Wheaton, IL

DOUBLE BACK *(Radio Shack)*

172,320	★Richard Winkelbauer, Bronx, NY
136,510	Don Mullis, Delavan, WI
51,470	Betty Mullis, Delavan, WI
50,700	Tristan Terkuc, Richmond, Ontario
34,990	Darren Lowe, White Rock, British Columbia

DOWNLAND *(Radio Shack)*

99,980	★Danny Wimett, Rome, NY
98,985	Karl Gulliford, Summerville, SC
97,740	Stephane Deshaies, Beloeil, Quebec
89,490	Neil Edge, Williston, FL
77,254	Tom Audas, Fremont, CA
73,346	Jean-Francois Morin, Loretteville, Quebec
70,142	Chris Goodman, Baltimore, MD
68,142	Cooper Valentin, Vavenby, British Columbia
67,721	Keith Yampanis, Jaffrey, NH
62,442	Eddie Lawrence, Pasadena, Newfoundland
55,300	Patrico Gonzalez, Buenos Aires, Argentina
49,500	Danny Perkins, Clifton Forge, VA
49,441	Kevin Pater, Port Alberni, British Columbia
49,254	David Brown, New Waterford, Nova Scotia
43,502	Mike Ells, Charlotte, MI
41,896	Antonio Hidalgo, San Jose, Costa Rica
40,360	Jesse Binns, Phoenix, AZ
34,424	Andrea Mayfield, Melbourne, FL
25,147	Timothy O'Neal, Commerce, TX
21,527	Scott Godfrey, Nashua, NH
19,835	Christopher Heston, Louisville, KY
18,251	Sam DiCerce, Willowich, OH
18,103	Sarah Van Oteghem, Taylor Ridge, IL
17,120	Kay McCluskey, Remsen, NY

DRAGON FIRE *(Radio Shack)*

160,835	★Eric Olson, Wheaton, IL
146,325	Stephane Martel, Laval, Quebec
5,561	Chris Lorenz, Kiester, MN

DRAC *(Tom Mix)*

104,850	★Don Mullis, Delavan, WI

ESCAPE 2012 *(Computerware)*

202	★Roy Grant, Toledo, OH

FIRESTORM (THE RAINBOW, 1/86)

22,505	★Chad Presley, Luseland, Saskatchewan
11,250	Stephane Martel, Laval, Quebec
5,680	Kathy Rumpel, Arcadia, WI
3,760	Rick Beevers, Bloomfield, MN
3,505	Blake Cadmus, Reading, PA

FRACTION FEVER *(Spinnaker)*

10,480	★Shawn Riggins, Orangevale, CA

GALACTIC ATTACK *(Radio Shack)*

26,370	★Jeff Remick, Warren, MI
10,600	Brian Crabtree, College Park, WA
9,930	Daniel Streidt, Cairo, Egypt

GALAGON *(Spectral Associates)*

357,890	★Jason Clough, Houston, TX
328,820	Bernard Burke, Lee's Summit, MO
249,960	Matthew Fumich, Munford, TN
169,410	Danny Dunne, Pittsfield, NH
149,520	Vernon Johnson III, Parkville, MD
138,500	Darren Brown, New Waterford, Nova Scotia
116,280	Scott Jamison, Billerica, MA
116,000	Micah Clough, Houston, TX
105,000	David Brown, New Waterford, Nova Scotia

GALAX ATTACK *(Spectral Associates)*

236,350	★Corey Leopold, Nada, TX
28,300	Augusto Voysest, Lima, Peru

GANTELET *(Diecom Products)*

23,643,720	★Geran Stalker, Rivordalo, GA
20,921,490	Randall Edwards, Dunlap, KS
10,222,940	Clinton Morell, Sacramento, CA
10,020,500	Ken Hubbard, Madison, WI
7,493,340	Stirling Dell, Dundalk, Ontario
2,626,950	Jonathon Ross, Pocomoke City, MD
2,512,620	Jason Steele, Pensacola, FL
2,312,640	Rory Kostman, Hershey, NE
2,115,790	Jerry Honigman, Waggoner, IL
2,011,200	Jerry Colbert, Bakersfield, CA
1,224,190	Jonathan Wanagel, Freeville, NY
1,108,750	Robert Fox, Dover, OH
1,094,280	Donnie Pearson, Arvada, CO
1,081,530	Michael Wallace, Bronx, NY
1,025,900	John Hotaling, Duanesburg, NY
1,016,050	Edward Swatek, Chicago, IL
933,740	Yvan Langlois, Laval, Quebec
932,660	Brian Hunter, South Berwick, ME
787,780	Brad Wilson, Lithia Springs, GA
685,840	Karen Jessen, Cleveland, OH

SCOREBOARD

667,390 Robbie Smith, Helena, HI
555,230 Larry Shelton, Marion, IL
456,220 Scott Jamison, Billerica, MA
410,868 Billy Helmick, Independence, KY
132,800 Lance Orner, Chico, CA

HALLOWEEN (THE RAINBOW, 10/86)
625 ★Clara Smith, Courtenay, British Columbia

HITCHHIKER'S GUIDE TO THE GALAXY *(Infocom)*
400/422 ★Jeff Holtham, Waterloo, Ontario
400/510 Brad Wilson, Lithia Springs, GA

JOKER POKER (THE RAINBOW, 3/87)
2,793,285 ★Blain Jamieson, Kingston, Ontario
205,239 Paul Dykes, Baton Rouge, LA
13,377 Jason Ebbeling, Berkshire, MA
11,000 Frankie DiGiovanni, Olney, MD

JUNIOR'S REVENGE *(Computerware)*
2,503,000 ★Stephane Martel, Laval, Quebec
257,600 Keith Cohen, Rocky Mount, NC

JUNKFOOD (THE RAINBOW, 11/84)
25,670 ★John Guptill, Columbia, MO
18,650 Daniel Streidt, Cairo, Egypt

KARATE *(Diecom Products)*
31,000 ★Wayne Hufford, Kincardine, Ontario
11,600 Jonathon Ross, Pocomoke City, MD
6,300 David Darling, Longlac, Ontario

THE KING *(Tom Mix)*
3,824,280 ★Andre Grenier, Quebec, Canada
49,400 Benoit Landry, Drummondville, Quebec
22,400 Spencer Metcalf, Longview, TX

KORONIS RIFT *(Epyx)*
186,710 ★Tony Harbin, Cullman, AL
184,180 Russell Johnson, Sarnia, Ontario
184,120 John Farrar, Lebanon, TN
133,990 Paul Blessing, Spring, TX
96,540 Doug Lute, Clymer, PA

KUNG-FU DUDE *(Sundog Systems)*
32,000 ★Tony Geitgey, University Park, PA

LUNAR RESCUE (THE RAINBOW 8/87)
260,427 ★Tom Beeker, Gracey, KY
246,668 Phillip Holsten, Modesto, CA
113,579 Jeff Remick, Warren, MI

MEGA-BUG *(Radio Shack)*
9,016 ★Heather Richwalski, Medford, WI
5,172 Jason Ebbeling, Berkshire, MA

MISSION: F-16 ASSAULT *(Diecom Products)*
468,750 ★Karen Jessen, Cleveland, OH
355,570 Stirling Dell, Dundalk, Ontario
318,160 Jeremy Pruski, Sandwich, IL
137,920 Mike Grant, Fresno, CA
127,550 Michael Heitz, Chicago, IL
120,670 Vernon Johnson III, Parkville, MD
58,530 Chris Wright, New Albany, IN

MUNCHKIN BLASTER (THE RAINBOW, 8/87)
10,420 ★Gabe Emerson, Baraboo, WI
9,760 Tom Beeker, Gracey, KY
9,080 John Weaver, Amsterdam, NY
9,000 Benoit Landry, Drummondville, Quebec
7,240 Jeff Remick, Warren, MI

ONE-ON-ONE *(Radio Shack)*
1,276-0 ★•Jonathan Dorris, Indianapolis, IN
1,210-0 •Gregg Thompson, Chesterfield, VA
1,204-0 •Chad Johnson, Benton, AR
1,160-0 •Mark Lang, Downieville, CA
1,132-23 Dan Liffmann, Andover, MA

PANIC BUTTON *(Radio Shack)*
2,192 ★Eric Olson, Wheaton, IL
190 Roby Janssen, Clear Lake, IA

PEGASUS AND THE PHANTOM RIDERS *(Radio Shack)*
303,100 ★Mike Grant, Fresno, CA
244,100 Martinez Domingo, Miami, FL
67,100 Ryan Grady, Newbury Park, CA

PINBALL *(Radio Shack)*
399,350 ★Troy Stoll, Washington, IN
213,300 Patrick Martel, Laval, Quebec
142,400 Thomas Payton, Anderson, SC

PITSTOP II *(Epyx)*
54 ★Rusty Breitbach, Rickardsville, IA
54 ★Jeff Coburn, Easton, PA
54 ★Walter Hearne, Pensacola, FL
54 ★Jeff Szczerba, Sturtevant, WI
54 ★Sean Noonan, Green Bay, WI
54 ★Brad Wilson, Lithia Springs, GA
51 Christian Grenier, Valleyfield, Quebec
49 Randy Venable, Coal City, WV
9 Laundre Clemon, Sacramento, CA

PLANETFALL *(Infocom)*
400/210 ★Brad Wilson, Lithia Springs, GA

POLTERGEIST *(Radio Shack)*
4,855 ★Darren Lowe White Rock, British Columbia

POPCORN *(Radio Shack)*
94,470 ★Patrick Martel, Laval, Quebec
44,010 Kevin Pater, Port Alberni, British Columbia
25,850 Matthew Leitman, Beaconsfield, Quebec

PYRAMID *(Radio Shack)*
220 ★Jason Ebbeling, Berkshire, MA

PYRAMID 2000 *(Radio Shack)*
220 ★Darren King, Yorkton, Saskatchewan
100 Peter Antonacopoulos, Toa Baja, Puerto Rico

PYRAMIX *(ColorVenture)*
17,170 ★Janet Kim, Pinckneyville, IL

QUIX *(Tom Mix)*
8,407,772 ★John Haldane, Tempe, AZ
1,404,000 Curtis Goodson, Sao Paulo, Brazil
1,003,104 Elisa Goodson, Sao Paulo, Brazil
326,192 Martin Parada, Arcadia, CA
205,335 John Hotaling, Duanesburg, NY
104,034 Christopher Conley, North Attleboro, MA

RESCUE ON FRACTALUS *(Epyx)*
270,000 ★Russell Johnson, Sarnia, Ontario
190,915 Leon Beggs, Bellingham, WA
167,947 Roger Smith, High Prairie, Alberta
133,661 James Andrews, Kissimmee, FL
99,967 Gary Sebastian, Hazel Park, MI

RETURN OF JUNIOR'S REVENGE *(Colorware)*
1,792,800 ★Chad Presley, Luseland, Saskatchewan

RETURN OF THE JET-I *(ThunderVision)*
309,250 ★Melody Webb, Lakeport, CA

ROGUE *(Epyx)*
27,542 ★Melanie Lapoint, Fitchburg, MA
21,682 Paul Blessing, Spring, TX
17,851 Yvan Langlois, Laval, Quebec
8,812 Allen Houk, San Diego, CA
6,576 Kirk Marshall, Westport, MA
6,204 Scot Drew, Ottawa, OH
5,679 David Spalding, Galena Park, TX
5,369 John Moore, Ottawa, OH
5,274 Reland Brumfield, LaJolla, CA
4,719 Mary Calcott, LaJolla, CA

SAILOR MAN *(Tom Mix)*
1,019,200 ★Gabriel Assel, Cameron, MO
341,800 Jason Clough, Houston, TX
332,600 Jeremy Carter, Spring Lake Park, MN
287,200 Patrick Devitt, Lombard, IL

SANDS OF EGYPT *(Radio Shack)*
67 ★Tristan Terkuc, Richmond, Ontario
82 Edward Rocha, Cobleskill, NY
86 Roy Grant, Toledo, OH
87 Neil Haupt, Elyria, OH
117 John Lente, Austin, TX

SANDWORM (THE RAINBOW, 8/86)
995 ★Matthew Smith, Courtenay, British Columbia

SHOOTING GALLERY *(Radio Shack)*
23,100 ★Richard Winkelbauer, Bronx, NY

SHOOT'N RANGE (THE RAINBOW, 8/87)
13,794 ★Phillip Holsten, Modesto, CA
5,998 Richard Winkelbauer, Bronx, NY
5,433 Benoit Landry, Drummondville, Quebec

SHORT-TERM MEMORY TEST (THE RAINBOW, 12/85)
20 ★Brian and Harold Matherne, Gretna, LA

SPACE ASSAULT *(Radio Shack)*
6,200 ★John Weaver, Amsterdam, NY

SPEED RACER *(MichTron)*
81,020 ★Wayne Hufford, Kincardine, Ontario

SPEEDSTER (THE RAINBOW 8/87)
22,750 ★Benoit Landry, Drummondville, Quebec
10,500 Sara Mittelstaedt, Kiel, WI
4,710 Andrea Reelitz, Greenville, IL
3,380 Kevin Hilton, Gurdon, AR
3,350 Jamie Stoner, Mt. Union, PA

STELLAR LIFE-LINE *(Radio Shack)*
629,000 ★Steven Smith, Matthews, NC
114,620 Martinez Domingo, Miami, FL

SUCCESS MANSION (THE RAINBOW, 1/87)
13/13 ★Dave Allessi, Iselin, NJ

SUPER ROOTER (THE RAINBOW, 5/86)
15,180 ★Richard Donnell, Penns Grove, NJ
11,090 Frederick Lajoie, Nova Scotia, Canada
3,910 Daniel Bradford, Birmingham, AL

TEMPLE OF ROM *(Radio Shack)*
303,600 ★Tim Hennon, Highland, IN
138,400 Gary Budzak, Westerville, OH

TREASURE QUEST (THE RAINBOW, 11/86)
29,340 ★Matthew Smith, Courtenay, British Columbia

TREKBOER *(Mark Data)*
132 ★Matthew Fumich, Munford, TN
123 Roy Grant, Toledo, OH

TUT'S TUMB *(Mark Data)*
118,720 ★Reina Roy, Carleton, Quebec
74,780 Mack Haynes, Nice, CA
72,000 Chad Presley, Luseland, Saskatchewan
60,020 Don Siler, Muncie, IN
45,000 Blake Cadmus, Reading, PA

VARLOC *(Radio Shack)*
2,032 ★Tony Harbin, Cullman, AL
2,032 ★Edward Rocha, Cobleskill, NY
2,008 Philip Puffinburger, Winchester, VA
1,995 Denise Rowan, Minneapolis, MN
1,991 Ryan Grady, Newbury Park, CA
1,988 Randall Edwards, Dunlap, KS
1,975 Bernard Florence, Croydon, Australia

VICIOUS VIC (THE RAINBOW, 7/86)
18,813 ★Talib Khan, Bronx, NY
11,902 Martha James, Swarthmore, PA
10,489 Karl Gulliford, Summerville, SC
6,294 Pat O'Neill, Nepean, Ontario
4,643 Martha James, Swarthmore, PA
3,285 Richard Donnell, Penns Grove, NJ

THE VORTEX FACTOR *(Mark Data)*
100/276 ★Tommy Crouser, Dunbar, WV
100/483 Rick & Brenda Stump, Laureldale, PA
210 Paul Maxwell, Vancouver, British Columbia

WARP FACTOR X *(Prickly-Pear)*
10,577,051 ★Doug Lute, Clymer, PA

WISHBRINGER *(Infocom)*
400/201 ★Brad Wilson, Lithia Springs, GA

WRESTLE MANIAC *(Diecom)*
956,971 ★Marc Reiter, Cincinnati, OH
546,315 Louis Bouchard, Gatineau, Quebec
45,483 Tony Bacon, Mt. Vernon, IN
42,105 David Brown, New Waterford, Nova Scotia
39,086 Billy Helmick, Independence, KY

ZAKSUND *(Elite Software)*
357,550 ★Martin Parada, Arcadia, CA
39,950 Walter Hearne, Pensacola, FL

ZAXXON *(Datasoft)*
2,061,000 ★Byron Alford, Raytown, MO
1,950,000 Blake Cadmus, Reading, PA
1,300,500 Dan Brown, Pittsford, NY
1,100,600 Andrew Urquhart, Metairie, LA
253,400 Bob Dewitt, Blue Island, IL
170,600 Matthew Yarrows, East Hampton, MA
163,700 Daniel Bradford, Birmingham, AL
127,600 Larry Shelton, Marion, IL
119,600 Daniel Streidt, Cairo, Egypt
118,100 Upton Thomas, Arnold, MD
111,400 Jeff Miller, Bronson, MI
87,200 Tim Lang, Downieville, CA
83,700 David Darling, Longlac, Ontario
81,000 David Anderson, Midlothian, VA
50,500 Andrew Rhodes, Atlanta, GA

ZONX (THE RAINBOW, 10/85)
6,500 ★Daniel Streidt, Cairo, Egypt

ZORK I *(Infocom)*
400/720 ★Brad Wilson, Lithia Springs, GA

ZUES *(Aardvark)*
3,380 ★Martin Kertz, Forrest City, AR

— **Jody Doyle**

SCOREBOARD POINTERS

In conjunction with THE RAINBOW's Scoreboard, we offer this column of pointers for our game-playing readers' benefit. If you have some interesting hints, tips or responses to questions, or want help yourself, we encourage you to write to the Scoreboard, c/o THE RAINBOW.

Feedback

In response to questions from:

- William Grace: In *Halls of Dungeon Death*, you need a mace to attack any golems — it's good to enchant the mace before the sword.

- Marc Prudhommeaux: You do need the 3-D glasses to escape the fuzzy room in *Wishbringer*. They're under the theater seat. Give the coin to Miss Voss to enter the theater.

In *Wishbringer*, move the joystick in the direction you walk. Press the button when you're done.

In *The Witness*, Phong can be pressured into revealing the truth through shown evidence, but the real evidence is found by hiding behind the office lounge and waiting until both Monica and Phong are in the room together.

John Hotaling
Duanesburg, NY

- Matt Swift: In *Pyramid 2000*, use the pillow to drop the delicate vase on.

- Eddie Baker: In *Sands of Egypt*, oil the scepter and go back to the pool. Then hook the scepter to the drain cover and drain the pool.

- Duane Fair: The container is east from the snake in *Sands of Egypt*. Be sure to get the oil. You will need it.

Lisa LaRiviere
Bellingham, WA

Scoreboard:

How do you kill the Dungeon Death in *Halls of Dungeon Death*? I have been to the dungeon seven times, amassed a maximum of 564 hit points and a combination of 11 potions and still get blown away. Is there any way to save the game up to a level?

Has anyone ever made it past Level 30 in *Gold Runner*? I have scored over 594,000 points but cannot get past that level.

Michael Mealey
Bushell Park, Saskatchewan

Scoreboard:

In *Dungeons of Daggorath*, I can kill the wizard's image, and when I do, he lays down a scroll. Why can't the scroll be picked up? Is there a third ring? If so, who has it and what level is it on?

James Green
Virginia Beach, VA

Scoreboard:

You can get water in your canteen from a pool in the desert in *Sands of Egypt*. To get there from the base of the cliff, go west then south and east. If you ride the camel any odd number of consecutive times, you will go from your origin to your destination. An even number of consecutive rides keeps you at your point of origin. After you go into the treasure room, take the ladder and get back to civilization to complete the game.

When you get to the spider the first time in *Trekboer*, save the game. After you give him the capsule, it takes three turns for him to pass out and become harmless. The second place you see the spider, just before you leave, type `DROP ALL` and `GET ALL` or you may be eaten by him.

Roy Grant
Toledo, OH

Scoreboard:

In *Dallas Quest*, I can get to the dinghy in Africa, bribe the monkey to stop the water from coming in, but I can't do anything after that.

Jason Ebbeling
Berkshire, MA

Scoreboard:

In *Sea Quest*, I have the anchor, pearl, silver and the statue. I need 20 more points to win. What else do I need and where is it?

In *Trekboer*, I cannot move the ship and I cannot operate anything. Please help.

Sean Noonan
Green Bay, WI

Scoreboard:

In *Sea Search*, how do I get the mermaid, the shark repellent and the object I keep stumbling over in the hold behind the falls? How do I get the key to open the trap door in the bungalow?

In *Shenanigans*, how do I stop falling off the rainbow? Does the pole help? How do I get it through the hole?

Jimmy Munroe
Sussex, New Brunswick

Scoreboard:

In *Pyramid*, how do you get past the snake in the pharaoh's chamber? How do you pick up the bird statue?

In *Raaka-Tu*, how do you get past the gargoyle?

Kurt Heiss
Glens Falls, NY

Scoreboard:

In *Pyramid 2000*, once you climb the plant and get the key and the egg, what do you do then? How do you get to the snake?

Kevin Pereira
Corsicana, TX

Scoreboard:

In *Pyramid 2000*, in order to kill the fierce green serpent, you must have the bird statue. But in order to get that, you must drop the scepter.

How do I get the flashlight so I can go down the ladder at Chugalug's trading post?

Robert Sherman
Fords, NJ

Scoreboard:

I just seem to be spinning my wheels in *The Andrea CoCo*. I can get into the Volks but I just wind up driving around in circles. Help!

Erick Molnar
Reno, NV

Scoreboard:

In *One-On-One*, smashing the backboard and making three-point shots are just luck. There's no sure way to do it.

In *Raaka-Tu*, you can't cross the rug.

In *Zaxxon*, in order to kill Zaxxon, you must destroy the missile before it is launched.

In *Black Sanctum*, when you open the

casket, type `LISTEN`. The corpse will tell you what you need to make the altar.

In *Sands of Egypt*, you can't get the scepter if you can't oil it first.

In *Forest Adventure*, how do you kill the troll?

In *Syzygy*, what do you do?

In *Fighter Pilot*, when you shoot down a big plane, shoot the parachutes, too. You will get two escort planes or you will start shooting five shots instead of two.

Matthew Fumich
Munford, TN

Scoreboard:

In *Caladuril Flame of Light*, how do I get by the sharp blades in the cavern?

John Peavy
Salem, OR

Scoreboard:

How do I open the sonic lock in the skyways in *Robot Odyssey I*?

In *Bedlam*, how do I get Napoleon to open the secret door?

Joseph Mangretta
Oklawaha, FL

Scoreboard:

In *Zork I*, typing `VERBOS` makes the computer give a room description each time you enter. To exorcise the entrance to Hades, you require the bell, candles, a source of flame and the black book. The problem is, when I get killed, I can't figure out how to become a physical being again. How do you get the platinum bar? What is the way through the maze? I can't map it because the thief keeps moving things around. Where is the pump to inflate the raft?

Patrick Cormier
Petrolia, Ontario

Scoreboard:

In *Hitchhiker's Guide to the Galaxy*, how do you get past the Bugblatter Beast of Traal? Where is the fluff and the key on Damogran?

In *Robot Odyssey*, how do you push the nine buttons on the 5th level? When a robot pushes the third button it starts all over again.

In *Bedlam*, how do you get the red key? How do you get to the blue doors? How do you stop the doctor from giving you shots?

In *Sands of Egypt*, where is the scepter?

Duncan Cameron
Chippewa Falls, WI

Scoreboard:

I am stuck on the last screen of *Ghana Bwana*. I have read the instructions on how to get the bow and continue to the altar to get the other bow, but after that I do not know how to kill the guardians on the altar.

David Kauffman
South Haven, MI

Scoreboard:

What is the Adventurer needed for in *Enchanter*? What do you do in the translucent rooms? Also, what do you do in the library with the rat hole? What do you do with the Kulcad scroll?

Use the turtle to get the Kulcad scroll. Use the sacrificial dagger from the altar to open the jeweled box. Also, use the Krebf spell to fix the scroll in the jeweled egg.

Adam Swiderski
Lexington, KY

Scoreboard:

In *Wishbringer*, I have everything except the glasses and the broomstick. I made it in the tower, but when I tried to go up the steps, I got trapped in "fuzziness."

Matt Smith
Spotsylvania, VA

Scoreboard:

There is a useful object in the Crevice of Nickelpedes in *The Magic of Zanth*, but it is hidden. You must examine things to find it. When you open the bottle, make sure you're in the cabin. When you come to the lake, keep your friends' safety in mind.

Lawrence Littlejohn
Gaffney, SC

Scoreboard:

To get through all the levels in *Dragon Slayer* with only three men is very frustrating due to the way the game save feature works. One way around this is to duplicate the original disk using *Spit-N-Image* by Computize.

Mark the copied disk 'A' and put the original away. Play the game on Disk A. After Level 1 is completed, press S as indicated in the instructions. Turn off the computer and copy Disk A using *Spit-N-Image* and label the second copy 'B'. When you want to resume playing, reinsert Disk A and you will then be on Level 2. After your men get killed, turn off the computer and copy Disk B onto Disk A. When you play again, you will start at the beginning of Level 2, whereas if you had not done all this copying, you would have started once again at the beginning of Level 1.

Edward Smith
New Castle, DE

Scoreboard:

Do not kill any car and you will receive 50,000 points after the pattern is completed in *Color Car Action*.

Louis-Serge Bouchard
Gatineau, Quebec

Scoreboard:

What do I have to do when I see the diamond appear in *Mr. Dig*? It happens often and I do not know what to do.

Also, where can I get the explanations for the game?

Gisele Duval
Sainte-Anne Des Plaines, Quebec

Scoreboard:

In *Strange Odyssey*, try pulling the rod, pushing it, then touching the plastic.

In *Trekboer*, the amulet is found on the ice planet. Remember not to enter the room where the plant is if you have pressed the button.

In *Shenanigans*, how do I get out of the town?

David Brown
New Waterford, Nova Scotia

Scoreboard:

In *Lansford Mansion*, to make the guard leave, type `YELL FIRE`. I have gotten up to the part where the piranhas are. I can't get the box out of the fish tank or pick up the piranha to feed to the dying man. Please help.

Ray Walsh
West Warwick, RI

Scoreboard:

In *Sir Randolf of the Moors*, how do you get out of the pit?

John Anderson
Baton Rouge, LA

To respond to other readers' inquiries and requests for assistance, reply to "Scoreboard Pointers," c/o THE RAINBOW, P.O. Box 385, Prospect, KY 40059. We will immediately forward your letter to the original respondent and, just as importantly, we'll share your reply with all "Scoreboard" readers in an upcoming issue.

For greater convenience, "Scoreboard Pointers" and requests for assistance may also be sent to us through the MAIL section of our Delphi CoCo SIG. From the CoCo SIG> prompt, pick MAIL, then type `SEND` and address to: `EDITORS`. Be sure to include your complete name and address.

Timing your investment decisions

Stock Analysis

By James E. Franz

The question investors most often ask is, "When is the right time to buy or sell a particular stock?" In times of market stability, efficient market timing techniques are often used to estimate when it's best to buy stocks (when they are at their lowest market value) and when to sell stocks (when at their peak value).

One market timing technique makes use of moving averages. In this technique, the average market value of a stock is computed over a time interval sufficiently long to minimize the effect of unusual fluctuations (weekly values are generally for a 30- or 39-week period). If the current market value of the stock is higher than its average value, this method signals for you to buy; conversely, values that are lower signal you to sell. Of course, prudent investors consider many additional factors before actually deciding whether to buy, sell or hold.

Investment Trends is written for a 64K ECB CoCo, single disk drive or cassette, and a DMP-100 printer. It will track general market indicators (e.g., Dow Jones Industrial Average, S&P 500 index, etc.), present investments and potential investments.

The program develops a 30-week moving average and computes the most recent six-week performance. It handles a maximum of 60 entities and has deletion, addition and correction capabilities for each entity. Also, there is a special correction feature for mutual funds.

The program asks you if the fund has a cash/capital gain distribution and then adjusts the `NAV` for the total distribution for all entries in the database. If a disk drive is plugged in, enter `PCLEAR1` before loading the program or you will get an OM Error.

Input data can be obtained from the financial section of local newspapers. A fair amount of time is required initially to put historical data into the database. Once the database is established, however, less than 30 minutes a week is required for updating 60 entities.

Since retiring from Bell of Pennsylvania, Jim Franz has completed courses of study in electronics, microprocessor technology and fundamentals of investing. He enjoys electronics, the CoCo and his 12 grandchildren.

Table 1

Trend Analyses of Market Indicators and Present/Potential Investments

```
MARKET INDICATOR

S&P500 INDEX
11/30- 209.6 12/7- 209.6 12/14- 209.6 12/21- 209.6 12/28- 209.61 1/4- 210.88 1/1
1- 205.96 1/18- 208.43 1/25- 206.43 2/1- 211.78 2/8- 214.56 2/15- 219.76 2/22- 2
24.62 3/1- 225 3/8- 225.57 3/15- 236.55 3/22- 233.34 3/29- 238.97 4/5- 228.69 4/
12- 235.97 4/19- 242.38 4/26- 242.29 5/3- 234.79 5/10- 237.85 5/17- 232.76 5/24-
 241.35 5/31- 247.35 6/7- 245.67 6/14- 245.73 6/21- 247.58

6-WEEK TREND         5/17        5/24        5/31        6/7        6/14        6/21

30-WEEK AVG        220.42      221.48      222.74     223.94     225.14      226.41
DEV FROM AVG        12.34       19.87       24.61      21.73      20.59       21.17
% DEVIATION          5.60        8.97       11.05       9.70       9.14        9.35



PRESENT INVESTMENT

MUTUAL FUND
11/30- 19.7 12/7- 19.7 12/14- 19.7 12/21- 19.7 12/28- 19.67 1/4- 19.81 1/11- 21.
29 1/18- 21.55 1/25- 21.33 2/1- 21.93 2/8- 22.28 2/15- 22.87 2/22- 23.41 3/1- 23
.47 3/8- 23.54 3/15- 24.75 3/22- 24.59 3/29- 25.04 4/5- 23.94 4/12- 24.73 4/19-
25.43 4/26- 25.42 5/3- 25.6 5/10- 25.98 5/17- 25.45 5/24- 26.4 5/31- 27.07 6/7-
26.91 6/14- 26.93 6/21- 27.13

6-WEEK TREND         5/17        5/24        5/31        6/7        6/14        6/21

30-WEEK AVG         22.31       22.54       22.78      23.02      23.26       23.51
DEV FROM AVG         3.14        3.86        4.29       3.89       3.67        3.62
% DEVIATION         14.06       17.15       18.82      16.89      15.76       15.39



POTENTIAL INVESTMENT

STOCK
11/30- 42 12/7- 42 12/14- 42 12/21- 42 12/28- 42.125 1/4- 43.125 1/11- 43.25 1/1
8- 43.375 1/25- 42.375 2/1- 42.375 2/8- 43.125 2/15- 44.375 2/22- 44.25 3/1- 44.
5 3/8- 44.875 3/15- 47 3/22- 45.25 3/29- 45 4/5- 43.625 4/12- 44.125 4/19- 44.25
 4/26- 43.875 5/3- 41.125 5/10- 41.375 5/17- 40.75 5/24- 40.5 5/31- 42.5 6/7- 41
 6/14- 43.25 6/21- 44.25

6-WEEK TREND         5/17        5/24        5/31        6/7        6/14        6/21

30-WEEK AVG         43.07       43.02       43.04      43.00      43.05       43.12
DEV FROM AVG        -2.32       -2.52       -0.54      -2.00       0.20        1.13
% DEVIATION         -5.39       -5.86       -1.25      -4.66       0.47        2.62
```

The output report provides the actual 30-week values and the most recent six-week comparisons. By examining the trends, you can see whether this market timing technique is signaling to buy, sell or hold and whether the trend is favorable or unfavorable. In addition, you can compare percentage deviation to general market deviations to see how well your investment is doing in comparison to the market.

To see how the program works, load and run `INVTREND`. Use the sample data in Table 1 for your input data. The program will create a data file (`TRNDDATA/DAT` for disk, `TRNDDATA` for tape).

If you input data from the table, your report will show only the most recent week in the six-week trend. This system has to be online for six weeks to develop trends in the database.

(Questions or comments about this program may be directed to the author at 136 Country Lane, Pittsburgh, PA 15229. Please include an SASE when writing for a reply.) ☐

70	113	605	119
170	64	677	247
310	119	830	183
371	15	1100	54
522	118	END	5

The listing: `INVTREND`

```
1 CLS:PRINT@138,"INVTREND":PRINT
@138+30,"BY JIM FRANZ":FORX=1TO2
000:NEXT
2 CLS:PRINT@96,"THIS PROGRAM PRO
VIDES ONLY ONE  OF MANY AIDS THA
T INVESTORS     SHOULD USE FOR T
IMING INVESTMENTDECISIONS. THE A
UTHOR IS NOT RE-SPONSIBLE FOR AN
Y DECISIONS MADETHROUGH USE OF T
HIS TIMING      METHOD OR USE OF
 THIS PROGRAM;";
3 PRINT"  FURTHER, THE AUTHOR IS
 NOT RE-  SPONSIBLE FOR ANY ERRO
NEOUS CAL-CULATIONS IN THE PROGR
AM ITSELF."
4 FORX=1TO15000:NEXT
5 CLEAR1500
10 DIMA(60,30),AV(60,6),PC(60,6)
,DF(60,6),T(60)
15 DIMA$(60),D$(30)
16 CLS:PRINT"PROGRAM DESCRIPTION
"
17 PRINT"THIS PROGRAM COMPUTES A
VERAGE    VALUES FOR A 30 WEEK PE
RIOD."
18 PRINT"IT ALSO COMPUTES % CURR
ENT VALUEOF AVG VAL ";
19 PRINT"AND SHOWS 6 WEEK     TR
ENDS.":PRINT"IT CAN TRACK 60 ENT
ITIES.":FORK=1TO9000:NEXTK
```

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```
20 CLS:PRINT"INVESTMENT TREND AN
ALYSIS"
30 PRINT" DO YOU WANT TO:"
31 PRINT"   (1)SET UP A NEW FILE"
32 PRINT"   (2)ADD INV/IND"
33 PRINT"   (3)DELETE INV/IND"
34 PRINT"   (4)CORRECT PAST DATA"
35 PRINT"   (5)UPDATE DATA"
36 PRINT"   (6)GET A PRINTOUT"
37 PRINT"   (7)QUIT"
38 INPUTC
39 IFP=1THENGOTO45
40 IFC>1ANDC<7THENGOSUB910:P=1
45 Y=I
50 ON C GOTO70,80,200,300,430,59
0,60
60 END
70 I=0
80 I=I+1
90 CLS:INPUT"NAME OF INDICATOR/I
NVESTMENT";A$(I)
100 PRINT"IS THIS A:"
101 PRINT"  (1)MARKET INDICATOR"
102 PRINT"  (2)PRESENT INVESTMEN
T"
103 PRINT"  (3)POTENTIAL INVESTM
ENT"
104 INPUTT(I)
110 AV=0
120 FOR J=1TO30
125 IFC=5ORC=4THEN145
127 IFC=2THENPRINT"VALUE WEEK EN
DING "D$(J):INPUTA(I,J):GOTO145
130 INPUT"DATE(WEEK ENDING-MM/DD
)";D$(J)
140 INPUT"VALUE";A(I,J)
145 AV=AV+A(I,J)
150 NEXTJ
160 AV(I,1)=AV/30:DF(I,1)=A(I,1)
-AV(I,1):PC(I,1)=DF(I,1)/AV(I,1)
*100
165 IFC=4ORC=5THENRETURN
170 CLS:INPUT"TYPE'N'FOR NEXT IN
VESTMENT/    INDICATOR OR 'D'FO
R DONE";B$
175 Y=I
180 IFB$="N"THENGOTO80
185 INPUT"DO YOU WANT TO SAVE TH
IS DATA    NOW(Y/N)";R$
186 IFR$="Y"THENGOSUB750
190 GOTO20
200 INPUT"TYPE NAME YOU WANT TO
DROP-IF   DONE TYPE 'D'";N$
210 IFN$="D"THENPRINT"DO YOU WAN
T TO SAVE THIS DATA NOW(Y/N)":IN
PUTR$
211 IFN$="D"ANDR$="Y"THENGOSUB75
0:GOTO20
212 IFN$="D"THEN20
220 K=0
230 FORI=1TOY
260 IFN$=A$(I)THENK=1
265 IFK=0THEN290
270 IFK=1THENT(I)=T(I+1):FORJ=1T
O30:A(I,J)=A(I+1,J):NEXTJ
280 IFK=1THENA$(I)=A$(I+1):FORJ=
1TO6:AV(I,J)=AV(I+1,J):DF(I,J)=D
F(I+1,J):PC(I,J)=PC(I+1,J):NEXTJ
284 CLS:PRINT"PLEASE WAIT"
290 NEXTI
291 IFK=0THEN PRINTN$"IS NOT IN
FILE"
292 IF K=0 GOTO200
293 Y=Y-1:PRINTN$" HAS BEEN DELE
TED":GOTO200
300 K=0:D1=0:D=0
310 CLS:INPUT"NAME TO CORRECT (I
F DONE TYPE    'D')";N$
320 IFN$="D"THENPRINT"DO YOU WAN
T TO SAVE THIS DATA    NOW(Y/N)?"
:INPUTR$
321 IFN$="D"ANDR$="Y"THENGOSUB75
0
322 IFN$="D"THEN20
323 PRINT:PRINT:INPUT"IS THIS AN
 NAV ADJUSTMENT CAUSEDBY MUTUAL
FUND DISTRIBUTION(Y/N)";R$
324 IFR$="Y"THEND1=1:PRINT
325 IFD1=1THEN INPUT"AMT OF DIST
RIBUTION/SHARE";D
326 PRINT:PRINT"PLEASE WAIT"
327 FORI=1TOY
330 IFK=1THEND1=0
331 K=0
340 IFN$=A$(I)THENK=1:M=1:CLS:PR
INTA$(I)
341 IF D1=1 AND K=1 THEN380
345 IFK=0THEN420
350 INPUT"CHANGE NAME Y/N";R$
360 IFR$="Y"THEN PRINT"ENTER COR
RECT NAME":INPUTA$(I)
370 PRINT"IS"T(I)"THE CORRECT TY
PE INV/IND   (Y/N)?":INPUTR$
371 IFR$="N"THENINPUT"TYPE CORRE
CTION";T(I)
380 FOR J=1TO30
381 IFD1=1THENA(I,J)=A(I,J)-D
382 IFD1=1THEN CLS:PRINT"NOW COR
RECTING THE DATA":GOTO410
390 PRINT"WANT TO CHANGE THIS VA
LUE?"
391 PRINTD$(J)"-"A(I,J)
392 INPUTR$
400 IFR$="Y"THENINPUT"TYPE NEW V
ALUE";A(I,J)
410 NEXTJ
415 GOSUB110
420 NEXTI
421 IFM=0THENPRINT"INV/IND NOT I
N FILE"ELSEPRINT"CORRECTION COMP
LETED"
422 FORK=1TO5000:NEXT:GOTO300
```

```
430 FORJ=30TO2STEP-1:D$(J)=D$(J-
1):NEXTJ
440 FORI=1TOY
450 CLS:PRINT"PLEASE WAIT"
460 A(I,30)=0:AV(I,6)=0:DF(I,6)=
0:PC(I,6)=0
470 FORJ=30TO2STEP-1
480 A(I,J)=A(I,J-1)
490 NEXTJ
500 FORJ=6TO2STEP-1:AV(I,J)=AV(I
,J-1):DF(I,J)=DF(I,J-1):PC(I,J)=
PC(I,J-1)
510 NEXTJ
520 NEXTI
522 INPUT"CURRENT DATE(WEEK ENDI
NG MM/DD)";D$(1)
523 FORI=1TOY
540 PRINTA$(I)
541 IFA$(I)=""THEN570
560 INPUT"PRES VALUE";A(I,1):GOS
UB110
570 NEXTI
575 GOSUB750:GOTO30
590 CLS:INPUT"WHEN PRINTER IS TU
RNED ON AND   PAPER IS SET, PRES
S <ENTER>";R$
591 PRINT#-2,"":PRINT#-2,"":PRIN
T#-2,"TREND ANALYSIS OF MARKET I
NDICATORS AND PRESENT/POTENTIAL
INVESTMENTS"
592 INPUT"DO YOU WANT TO INCLUDE
 DETAILED 30 WEEK DATA(Y/N)";F$
600 G=0:PRINT"DO YOU WANT A PRIN
TOUT OF:"
601 PRINT"   (1)MARKET INDICATORS
 ONLY"
602 PRINT"   (2)PRESENT INVESTMEN
TS ONLY"
603 PRINT"   (3)POTENTIAL INVESTM
ENTS ONLY"
604 PRINT"   (4)ALL OF THE ABOVE"
605 PRINT"   (5)RETURN TO MAIN ME
NU":INPUTC1
606 FORK=1TO4:PRINT#-2,"":NEXTK:
IFC1=1THENPRINT#-2,"MARKET INDIC
ATOR"
607 IFC1=2THENPRINT#-2,"PRESENT
INVESTMENT"
608 IFC1=3THENPRINT#-2,"POTENTIA
L INVESTMENT"
609 IFC1=4THENC1=1:G=1:GOSUB606:
C1=2:GOSUB606:C1=3:GOSUB606:GOTO
20
610 IFC1=5THEN20
611 FORI=1TOY
620 IFC1=1ANDT(I)=1THENGOSUB670
630 IFC1=2ANDT(I)=2THENGOSUB670
640 IFC1=3ANDT(I)=3THENGOSUB670
```

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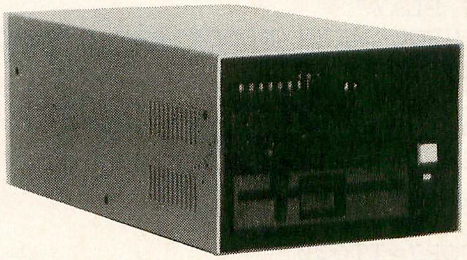

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COMMANDS SUPPORTED:

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   CLOSE CLOADM CSAVEM DIR DRIVE DSKI$ DSKO$ FIELD
   FILES GET INPUT KILL LSET OPEN PRINT PUT
   RSET USING LINEINPUT
2. Program control commands
   CALL DEFUSR END EXEC FOR NEXT GOSUB GOTO
   IF THEN ELSE ERROR ON RETURN STOP USR
3. Functions
   ABS ASC ATN COS CVN EOF EXP FIX
   HPOINT INSTR INT LEN LOG LPEEK LOC LOF
   PEEK POINT PPOINT RND SGN SIN SQR TAN
   TIMER VAL VARPTR
4. String functions
   CHR$ INKEY$ LEFT$ MID$ MKN$ RIGHT$ STR$ STRING$
5. Graphic/Screen commands
   ATTR COLOR CLS CIRCLE DRAW HCOLOR HSCREEN HDRAW
   HLINE HPAINT HPRINT HRESET HCIRCLE HCLS HSET JOYSTK
   LINE LOCATE PALETTE PAINT PCLEAR PCLS PLAY PMODE
   PRESET PSET RESET SCREEN SET SOUND WIDTH
6. Other commands
   DATA DIM MOTOR POKE LPOKE RESTORE READ REM
   TRON TROFF TAB VERIFY

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```
660 NEXTI
661 IFG=1THENRETURNELSEGOTO600
670 PRINT#-2,"":PRINT#-2,"":PRIN
T#-2,"":PRINT#-2,A$(I)
671 IFF$<>"Y"THEN673
672 FORJ=30TO1STEP-1:PRINT#-2,D$
(J)"-"A(I,J);:PRINT#-2,"";:NEXTJ
673 PRINT#-2,"":PRINT#-2,"":PRIN
T#-2,"6-WEEK TREND       ";D$(6
);"       "D$(5);"       ";D$(4)
;"       ";D$(3);"        ";D$(2
);"       "D$(1)
675 PRINT#-2,"":PRINT#-2,"30-WEE
K AVG  ";:GOSUB700
676 PRINT#-2,"":PRINT#-2,"DEV FR
OM AVG ";:GOSUB710
677 PRINT#-2,"":PRINT#-2,"% DEVI
ATION  ";:GOSUB720:PRINT#-2,"":R
ETURN
700 FORJ=6TO1STEP-1:PRINT#-2,USI
NG"    ####.##";AV(I,J);:NEXTJ:R
ETURN
710 FORJ=6TO1STEP-1:PRINT#-2,USI
NG"    ####.##";DF(I,J);:NEXTJ:R
ETURN
720 FORJ=6TO1STEP-1:PRINT#-2,USI
NG"    ####.##";PC(I,J);:NEXTJ:R
ETURN
750 PRINT"NOW WE'LL SAVE THIS DA
TA."
751 INPUT"DATAFILE:(D)DISK OR (T
)TAPE";S$
752 IF S$="T"THEN1100
753 IFS$<>"T" AND S$<>"D"THEN750
755 CLS:PRINT"NOW WE'LL SAVE THI
S DATA ON DISK.WHEN READY PRESS
<ENTER>":INPUTR$
782 OPEN"O",#2,"TRNDDATA/NEW"
790 FORI=1TOY
800 WRITE#2,A$(I)
805 WRITE#2,T(I)
810 FOR J=1TO30
820 WRITE#2,A(I,J)
825 IFI=1THENWRITE#2,D$(J)
830 NEXTJ
840 FORJ=1TO6
850 WRITE#2,AV(I,J),DF(I,J),PC(I
,J)
860 NEXTJ
880 NEXTI
889 CLOSE#2
890 IFC=1THEN892
891 KILL"TRNDDATA/DAT"
892 RENAME"TRNDDATA/NEW"TO"TRNDD
ATA/DAT"
900 RETURN
910 INPUT"IS YOUR DATAFILE (D)DI
SK OR     (T)TAPE";S$
911 IFS$="T"THEN1200
912 IFS$<>"T" AND S$<>"D" THEN91
0
915 CLS:PRINT"NOW WE'LL LOAD PAS
T DATA. WHEN  THE DISK IS READY
PRESS <ENTER>":INPUTR$
920 I=0
930 OPEN"I",#1,"TRNDDATA/DAT"
940 IFEOF(1)=-1THEN1040
950 I=I+1
960 INPUT#1,A$(I),T(I)
970 FORJ=1TO30
980 INPUT#1,A(I,J)
985 IFI=1THENINPUT#1,D$(J)
990 NEXTJ
1000 FORJ=1TO6
1010 INPUT#1,AV(I,J),DF(I,J),PC(
I,J)
1020 NEXTJ
1030 GOTO940
1040 CLOSE#1
1050 RETURN
1100 CLS:PRINT:PRINT:PRINT:PRINT
:PRINT"TO SAVE THIS DATA":PRINT"
PLACE A CLEAN TAPE IN THE":PRINT
"CASSETTE AND PRESS PLAY":PRINT"
AND RECORD"
1110 INPUT"WHEN READY PRESS <ENT
ER>";R$
1120 OPEN"O",#-1,"TRNDDATA"
1130 FORI=1TOY
1140 PRINT#-1,A$(I),T(I)
1150 FORJ=1TO30
1160 PRINT#-1,A(I,J)
1165 IFI=1THENPRINT#-1,D$(J)
1170 NEXTJ
1175 FORJ=1TO6
1180 PRINT#-1,AV(I,J),DF(I,J),PC
(I,J)
1185 NEXTJ
1190 NEXTI
1191 CLOSE#-1
1192 RETURN
1200 CLS:PRINT"INSERT <TRNDDATA>
 TAPE IN":PRINT"THE CASSETTE AND
 PRESS PLAY"
1201 INPUT"WHEN READY PRESS <ENT
ER>";R$
1205 I=0
1210 OPEN"I",#-1,"TRNDDATA"
1215 IFEOF(-1)=-1THEN1297
1220 I=I+1
1230 INPUT#-1,A$(I),T(I)
1240 FORJ=1TO30
1250 INPUT#-1,A(I,J)
1260 IFI=1THENINPUT#-1,D$(J)
1270 NEXTJ
1280 FORJ=1TO6
1285 INPUT#-1,AV(I,J),DF(I,J),PC
(I,J)
1290 NEXTJ
1295 GOTO1215
1297 CLOSE#-1
1299 RETURN
```

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Determine whether you save or lose by paying off a loan early

Rule of 78's

By Jack W. Eizenga

Every month, as you mail the checks to pay off your loans, it may cross your mind that you could save money by paying off the loans ahead of time. Don't go digging into your savings account right away, however — sometimes you are penalized by early payoffs.

Check your loan documents carefully. If you find that a payoff is subject to the Rule of 78's, you could pay more than the balance due if you pay it off early.

The program, *Rule of 78's*, compares simple interest against the loan repayment Rule of 78's and shows the penalty for paying off a loan early. Bankers and finance companies aren't out to do you any favors, and the IRS will not allow the excess interest. This program compares those costs month-for-month prior to the end of the loan term.

Interest and the Rule of 78's

Bankers and finance companies don't want to recalculate loans that are paid off early. In fact, they will do as little calculating as absolutely necessary. They would rather use charts prepared at the main office by one of the newer (read "low paid") employees. When a loan is paid off early, they have to recalculate the entire loan using the shorter period — and this doesn't work too well because the tables are usually set up for six-month to one-year periods.

Some genius found that simple interest could be approximated by applying interest equally to each month of the loan term. As you pay interest for 12 months in a year, you add the months together, i.e., 12+11+10+. . .2+1=78. Each payment due is a numerator of that fraction in a decreasing sequence.

The first month you pay $^{12}/_{78}$ of the interest, the next month $^{11}/_{78}$, and so forth. If the loan is paid off two months early, the rebate of interest is 1+2=3/78ths of the total finance charge for the year. Thus, the rule of 78's. Expressed as a mathematical equation, it would look like this:

$$I=(m)(m+1)/2$$

Because one of the terms (m) or (m+1) is always an even number, this can be done mentally. For a 12-month loan, (m) is 12 and (m+1) is 13; dividing 12 by 2 equals 6, and 6 times 13 equals 78 (78=12*13/2). Suppose you pay off a loan in six months; the result is 21:

$$6*7/2 = 3*7 = 21$$

Therefore, your rebate is 21/78 of the total for the year.

Now, take your four-year car loan: The dealer writes *x* dollars finance charge on the loan application and tells you that you hit the lottery and will be able to pay it off in 15 months. Here's the calculation: 48*49/2=24*49=2,352 parts of our Rule of 78's. Your rebate would be 5.1 percent (15*16/2=15 *8=120/2,352=5.1%) of the total interest. That's not nice, you say. You're right, it's not. CoCo to the rescue.

The Program

Rule of 78's can be used on any CoCo. For use on CoCos 1 and 2, delete Line 100. However, for full effect, an 80-column display is best. I kept the CoCo 3 commands limited to a single line (Line 100) for this versatility. If you are limited to a 32-column screen, you will especially want a hard copy printout. A printer is not required, but it is highly recommended.

The real comparison necessary is the difference between the simple interest per month and the Rule of 78's per month. The printouts do that for you. When you run *Rule of 78's* you are given the choice of printer, screen, or both. Then you are asked the amount of the loan, the term of the loan in months and the interest rate entered as a percentage (8.9% = 8.9). *Rule* calculates the monthly interest, principal and balance by both simple interest and the Rule of 78's.

The sample printout shows the actual output for an automobile loan of $7,231.30 for 48 months at an annual percentage rate of 10.3 percent. You are able to readily observe the differences in the payoff calculations. As you approach the end of the term, the interest calculations tend to equalize. However,

Jack Eizenga holds a degree in accounting and is a retired IRS agent. In addition to being an enrolled agent and tax consultant, he also is currently disk librarian and treasurer of the Color America Users Group in California.

the finance company is always ahead for the first year and a half. That's why the Rule of 78's is used. Experience has shown that the first year is when most defaults and/or payoffs occur.

The totals at the bottom of the page show that the total interest and principal are the same under either method if you pay according to the contract. The balance remaining is due to rounding errors and can and will be ignored.

Monthly payments are calculated in Line 240. The sum of principal and interest is equal to the monthly payment under either method. The loop in lines 300 through 410 calculates the principal and interest for each month. The formula in Line 120 rounds all payments to the nearest cent.

The interest according to the simple interest formula (I) is the principal balance remaining (B) times the monthly interest rate (R). According to the Rule of 78's, the interest (I7) is the finance charge (F) times the units assigned to the month in question (T-N+1) divided by the total number of units for the loan (U=T*(T+1)/2). The finance charge is the total of payments minus the loan amount (F=M*T-B) in Line 250.

Comparison of Simple Interest and Rule of 78's

```
                          LOAN = 7231.3
                          TERM = 48 MONTHS
                          INTEREST = 10.3 PERCENT PER YEAR
                          MONTHLY PAYMENT = $ 184.45

             SIMPLE INTEREST                        RULE OF 78'S                78'S
      ---------------------------------  ---------------------------------    EXCESS
       MONTHS     MONTHS     BALANCE     MONTHS      MONTHS     BALANCE     INTEREST
      INTEREST   PRINCIPAL  REMAINING   INTEREST    PRINCIPAL  REMAINING    TO-DATE
      --------   --------   --------    --------    --------   --------     --------
 1      62.07     122.38    7108.92      66.21       118.24    7113.06        4.14
 2      61.02     123.43    6985.49      64.83       119.62    6993.44        7.95
 3      59.96     124.49    6861.00      63.45       121.00    6872.44       11.44
 4      58.89     125.56    6735.44      62.07       122.38    6750.06       14.62
 5      57.81     126.64    6608.80      60.69       123.76    6626.30       17.50
 6      56.73     127.72    6481.08      59.32       125.13    6501.17       20.09
 7      55.63     128.82    6352.26      57.94       126.51    6374.66       22.40
 8      54.52     129.93    6222.33      56.56       127.89    6246.77       24.44
 9      53.41     131.04    6091.29      55.18       129.27    6117.50       26.21
10      52.28     132.17    5959.12      53.80       130.65    5986.85       27.73
11      51.15     133.30    5825.82      52.42       132.03    5854.82       29.00
12      50.00     134.45    5691.37      51.04       133.41    5721.41       30.04
13      48.85     135.60    5555.77      49.66       134.79    5586.62       30.85
14      47.69     136.76    5419.01      48.28       136.17    5450.45       31.44
15      46.51     137.94    5281.07      46.90       137.55    5312.90       31.83
16      45.33     139.12    5141.95      45.52       138.93    5173.97       32.02
17      44.14     140.31    5001.64      44.14       140.31    5033.66       32.02
18      42.93     141.52    4860.12      42.76       141.69    4891.97       31.85
19      41.72     142.73    4717.39      41.38       143.07    4748.90       31.51
```

Calculating the Rule of 78's won't keep you from having the penalty assessed, but it can help you avoid the crushing feeling that comes when you pay off a loan and find you owe more money than you thought you did.

(Questions or comments may be directed to the author at 3811 N. Foster Ave., Baldwin Park, CA 91706. Please enclose an SASE when writing for a response.) ☐

270 ......**171**
390 ......**196**
530 ....**35**
740 ....**26**
END **97**

The listing: RULEOF78

```
100 PALETTE0,0:WIDTH80:CLS1:ATTR
3,0:POKE150,1
105 CLEAR3000
110 'SIMPLE INTEREST VS RULE OF
78'S
120 DEF FNR(X)=INT(100*X+.5)/100
:'ROUND TO NEAREST WHOLE CENT
130 F$="#######.##":I$="###":I1=
0:I0=0
140 PRINT TAB(6):INPUT"OUTPUT TO
 SCREEN <1>, PRINTER <2> OR BOTH
 <3>";Z
150 PRINT TAB(6);"PRESS THE SPAC
EBAR TO HOLD SCREEN PRINTING"
160 PRINT TAB(6);"AND PRESS <ENT
ER> TO CONTINUE"
200 PRINT TAB(6):INPUT"ENTER THE
 LOAN AMOUNT";B:B7=B
210 PRINT TAB(6):INPUT"ENTER THE
 TERM OF THE LOAN IN MONTHS";T
```

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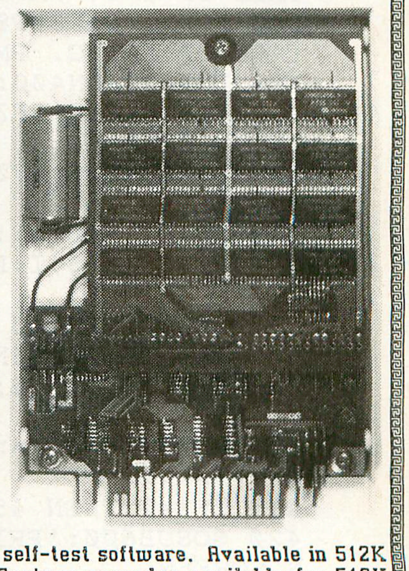

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```
220 PRINT TAB(6):INPUT"ENTER THE
 ANNUAL INTEREST RATE AS A PERCE
NT";R
230 R=R/1200:'MONTHLY INTEREST A
S A DECIMAL
240 M=B*R/(1-(1+R)^(-T)):'MONTHL
Y PAYMENT
250 F=M*T-B:'FINANCE CHARGE
260 M=FNR(M):'WHOLE CENT PAYMENT
270 U=T*(T+1)/2:'UNITS FOR THIS
TERM
275 IF Z=2THEN 290
280 GOSUB500:'PRINT HEADER ON SC
REEN
285 IFZ=1THEN300
290 GOSUB700:'PRINT HEADER ON PR
INTER
300 FORN=1TOT:'<<<<LOOP<<<<<<<<<
<<<<<<<<<<<<
310 I=FNR(B*R):'MONTH'S INTEREST
 PAYMENT
320 P=M-I:'MONTH'S PRINCIPAL PAY
MENT
330 B=B-P:'BALANCE REMAINING AFT
ER PAYMENT
340 I7=FNR(F*(T-N+1)/U):'78'S MO
NTHLY INTEREST
350 P7=M-I7:'78'S MONTHLY PRINCI
PAL
360 B7=B7-P7:'78'S BALANCE REMAI
NING
370 I1=I1+I:I8=I8+I7:'RUNNING TO
TALS OF INT. PMNTS.
380 P1=P1+P:P8=P8+P7:'RUNNING TO
TALS OF PRINC. PMNTS.
385 IFZ=2THEN400:'
386 Z$=INKEY$:IFZ$<>CHR$(32)THEN
390ELSE387
387 Z$=INKEY$:IFZ$=CHR$(13)THEN
390ELSE387
390 PRINT TAB(6):PRINTUSINGI$;N;
:PRINTUSINGF$;I;P;B;I7;P7;B7;I8-
I1:'
395 IFZ=1THEN410
400 PRINT#-2,USING I$;N;:PRINT#-
2,USING F$;I;P;B;I7;P7;B7;I8-I1:
'
410 NEXTN:'>>>>>>>>>>>>>>>>>>>>>
>>>>>>>>>>>>
415 IFZ=2 THEN 450
420 GOSUB600:'PRINT UNDERLINES O
N SCREEN
430 PRINT TAB(6);"SUM";:PRINT US
ING F$;I1;P1;B;I8;P8;B7;I8-I1
435 IF Z=1 THEN 460
440 GOSUB 800:'PRINT UNDERLINE O
N PRINTER
450 PRINT#-2,"SUM";:PRINT#-2,USI
NG F$;I1;P1;B;I8;P8;B7;I8-I1
455 IF Z=2 THEN 820
460 END
500 CLS: PRINT TAB(25);"COMPARIS
ON OF SIMPLE INTEREST"
510 PRINT TAB(30);"AND RULE OF 7
8'S":PRINT
520 PRINT TAB(30);"LOAN =";B
530 PRINT TAB(30);"TERM =";T;"MO
NTHS"
540 PRINT TAB(30);"INTEREST =";1
200*R;"PERCENT PER YEAR"
550 PRINT TAB(30);"MONTHLY PAYME
NT = $";M: PRINT:PRINT
560 PRINT TAB(19);"SIMPLE INTERE
ST";TAB(15);"RULE OF 78'S";TAB(1
2);"78'S"
570 L$=STRING$(28,"-"):PRINT TAB
(6);"    ";L$;" ";L$"  EXCESS
"
580 PRINT TAB(6);"     MONTHS
  MONTHS    BALANCE   MONTHS
MONTHS    BALANCE  INTEREST"
590 PRINT TAB(6);"     INTEREST
 PRINCIPAL REMAINING INTEREST  P
RINCIPAL REMAINING  TO-DATE"
600 PRINT TAB(6);"    ";:FORI=1TO
7:PRINT"  --------";:NEXT I:PRIN
T
610 RETURN
700 PRINT#-2:PRINT#-2:PRINT#-2,T
AB(20);"COMPARISON OF SIMPLE INT
EREST AND RULE OF 78'S"
710 PRINT#-2
720 PRINT#-2,TAB(30);"LOAN =";B
730 PRINT#-2,TAB(30);"TERM =";T;
"MONTHS"
740 PRINT#-2,TAB(30);"INTEREST =
";1200*R;"PERCENT PER YEAR"
750 PRINT#-2,TAB(30);"MONTHLY PA
YMENT = $";M:PRINT#-2:PRINT#-2
760 PRINT#-2, TAB(13);"SIMPLE IN
TEREST";TAB(44);"RULE OF 78'S";T
AB(68);"78'S"
770 L$=STRING$(28,"-"):PRINT#-2,
 "    ";L$;"  ";L$;"   EXCESS"
780 PRINT#-2,"      MONTHS    MO
NTHS    BALANCE   MONTHS    MONT
HS   BALANCE  INTEREST"
790 PRINT#-2,"     INTEREST  PRI
NCIPAL REMAINING INTEREST  PRINC
IPAL REMAINING  TO-DATE"
800 PRINT#-2,"   ";:FOR I=1 TO 7
:PRINT#-2," --------";:NEXT I:P
RINT#-2
810 RETURN
820 END
```

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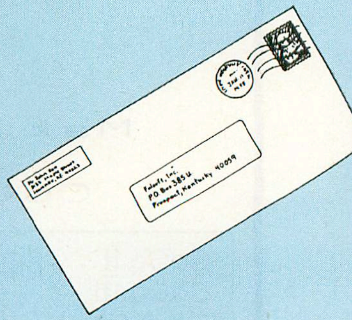


The Post Office

By Orman Cyril Beckles II

The Post Office just may be the best mailing list program ever for the CoCo 3. How can I claim this? Because after looking at all the rest, I designed one with more features. This program was over five months in the making and one month in the testing. It is easy to use because it's totally menu-driven and user-prompting. Here are a few things *The Post Office* can do:

- hold more than 900 addresses
- look up ZIP codes automatically
- double-check with you before printing and deleting
- work in 40 or 80 columns, as you choose
- print form letters
- allow advanced cursor editing in the Add and Edit modes
- operate in a very user-friendly fashion
- work with most RAM disk programs

Orman Beckles works for an engineering firm outside Boston. He writes programs for the IBM as well as for the Color Computer.

Running the Program

After typing in and saving the program, enter `RUN "POST"`. The main menu will appear, and look like this:

<A> Add Addresses
<D> Delete Addresses
<E> Edit Addresses
<F> Form Letters
<P> Print Routines
<X> Exit From Program

The main menu screen also displays the present number of records and an *estimated* number of free records. To return to the main menu from within any option, press BREAK.

Adding and Deleting Addresses

Select menu Option A. There is no need to press ENTER. You will see nine fields awaiting your entry of data. Code, the first field, is a non-printable field used for categorizing records. Some examples might be the following: Xmas, Regular, Pen Pal, Mother's, Father's, Active, Inactive and Overdue.

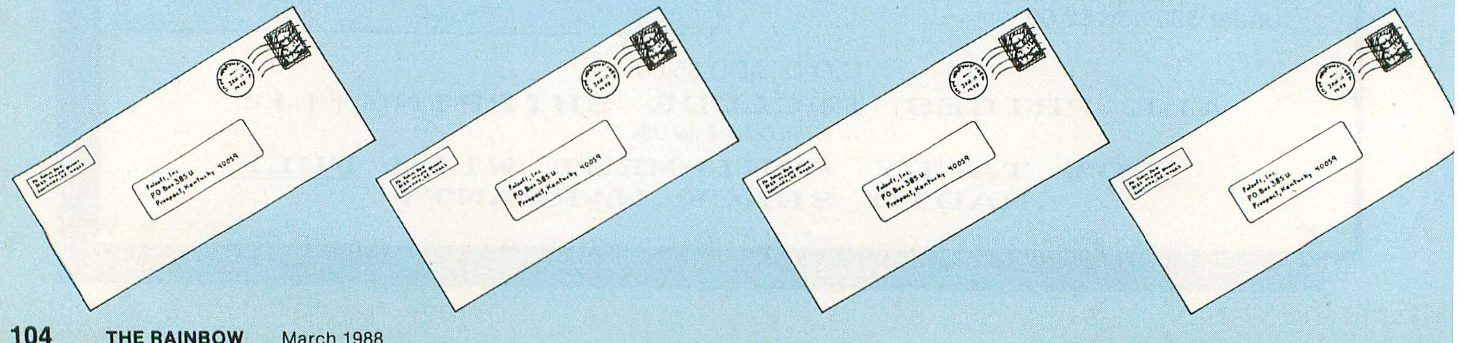
For the second field, Name, type in the person's name just as you want it to appear on the label. You may use the left arrow key to erase the last printed character. When you have finished with Name, press either ENTER or the down arrow key. Do the same for the Address, City and State fields.

When you get to the ZIP code field, the disk drive will activate for a second. If you are using a new disk, there will be no ZIP codes on file. Enter the ZIP code. Since *PO* will not allow you to alter a ZIP code once it has been placed in the ZIP codes file, be sure that it is correct before going to the next record. The ZIP codes file is updated each time a new ZIP code is introduced.

PO will use the ZIP code you entered whenever both the city and state match a record in the ZIP code file. It will allow you to interchange the abbreviation and full name of a state. However, the city must be exact. For example:

Mass — Ma = Match
Bedford — New Bedford = No Match

Enter the person's phone number in the Telephone # field. In the F, L Name field, type in the person's first name



followed by a comma, and then type the last name, e.g., Orman, Beckles.

The F/L Name field is used with the Form Letter module; the comma is used so that the program can distinguish between the first and last names. The names can be typed in uppercase if you like, since *PO* will convert them to the proper mixture of upper-/lowercase.

When you reach the Country field, look at the record — if you want to change any field, use the up arrow key to move up to it. Make the change, and use either the down arrow key or ENTER to get back to the Country field. Change the country or simply press ENTER. The drive will activate and the record will be saved. In addition to saving the record, *PO* will save the ZIP code you entered.

The next record then appears. It will look like the last record. You may change any field you want by using the up and down arrow keys to move to that field and then typing in the new information. To exit, simply press BREAK. The record on the screen will *not* be saved, and the main menu will appear.

Select D for Delete. The screen will display all the fields you saw in the Add Address option numbered 1 through 9, plus an option to default to any of the nine. You are prompted to select the field (press the appropriate number) "where deletion can be found." Pressing ENTER is the same as pressing 0.

You are then prompted to "Enter string to delete." Enter the string you are searching for, but type only what you need:

Bost Match = Boston
BO Match = Boston, Boulton
B Match = Boston, Boulton Bedford

As you can see, the more of the string you type, the more selective the records pulled. Entering an empty carriage return will result in all the records being selected. The first record will be displayed. Press Y (yes) to delete the record, and N (no) to not delete the record. Press A to automatically select all the records that meet the match you specified. When the whole file has been checked, *PO* will give you a quick double-check by displaying key information about each record. In the 40-column mode, the field will always be the Code and Name fields. In the 80-column mode, the field being searched and a randomly chosen field will be displayed. You are shown the number of fields marked for deletions and asked, "Do you really want to erase these?" Pressing N will abort the process. Pressing Y will delete the records forever. When *PO* is finished, the main menu will appear.

Editing Addresses

Select E for Edit. The screen will display the familiar nine fields (numbered) and the default ("any of the above"). You are prompted to select field "where edit string can be found."

Specify the field you want to search by pressing the appropriate number. (Pressing ENTER is the same as pressing 0.) The screen will ask you to enter the string to edit. Entering an empty line will select all the records; each record will be displayed and changes may be made. As in the Add option, after the Country field the record will be put back in the file.

Form Letters

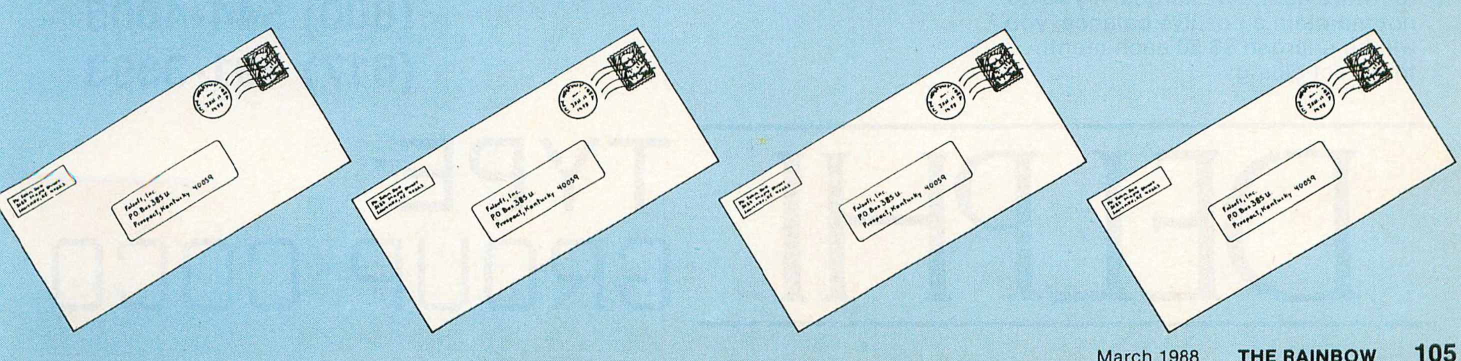
Select F for Form. Again, the screen displays the nine fields and the default. Specify the field you want to search by pressing the appropriate number. You are asked to enter the string to print and to enter the name of the letter file.

Again, the more of a string you type, the more selective the records pulled. Merely pressing ENTER will result in all the records being selected. The "Letter File" is the ASCII-saved letter where the variable `.FN.` is used wherever you want the first name to be printed, and `.LN.` wherever the last name is to be printed. For example:

Dear `.FN.`*,*

I see by my own records that you are eligible for a special discount. If I can be of any service to you Mr. `.LN.`*, please let me know.*

Your friend,
John Q. Public



WE'RE BRINGING THE COCO

RAINBOW'S BROADENING ITS SPECTRUM

THE RAINBOW and the Delphi Information Utility have joined together to allow CoCo owners all over the world to connect with one another!

Delphi is a full-service information utility. It offers everything from up-to-the-minute news stories from The Associated Press to electronic mail services. But, *best of all*, it now has **a special forum for Color Computer owners, and it's operated by the people who bring you THE RAINBOW each month.**

The CoCo Special Interest Group (SIG) features a variety of services, including an open forum where you can send and receive messages from Color Computer owners all over the world. It also has several databases to which you can upload your favorite programs and from which you can download programs written by other CoCo enthusiasts. Some of these databases are BASIC programming, OS-9 and home applications.

When setting up your account with Delphi, if you do not have a credit card or prefer not to use it, Delphi requires that you send $25 to give your account a positive balance. This will be refunded after your first free hour if you choose to no longer use the system or it will be applied to future connect charges. If you do not maintain a positive balance, you will be charged $3.50 each month for direct billing.

PEEK INTO THE RAINBOW

The CoCo SIG's conference feature allows you to meet electronically with other members of the CoCo Community. You can join conferences with notables such as Dale Puckett, Cray Augsburg, Marty Goodman, Don Hutchison, Jim Reed, Lonnie Falk and others — on a regular basis. Conference schedules will appear in THE RAINBOW each month. Be sure to check online announcements for changes and additions.

THE OTHER SIDE OF THE RAINBOW

On Delphi, you also are able to buy RAINBOW ON TAPE — order a whole set, or download an individual program immediately. You can also renew your RAINBOW subscription, make a fast and easy order for software or hardware from a multitude of vendors, or inquire about products on the CoCo SIG.

We also have a number of **programs that you can download** and use, just for the cost of the time you spend transferring them. There'll also be **corrections for RAINBOW articles**, helpful hints and many other useful features.

FREE LIFETIME MEMBERSHIP

THE RAINBOW is offering subscribers a free lifetime subscription to Delphi — a $24.95 value — and a free hour of connect time — a $7.20 value at either 300, 1200 or 2400 Baud — so you can sample Delphi and the RAINBOW CoCo SIG. That's right. Your subscription to THE RAINBOW entitles you to this $32.15 value as a ***free bonus!***

If you're not a RAINBOW subscriber, just enter your order when you sign on with Delphi and you'll get the same great deal! For our $31 subscription fee, you'll get the finest Color Computer magazine ever, a free lifetime subscription to Delphi and a free hour of connect time.

SAVE EVEN MORE

Want to save even more? While you're online you can order, for only $29.95, a deluxe package which includes the Delphi membership, the *Delphi Handbook and Command Card* ($21.95) and a total of three hours of connect time ($21.60).

Delphi provides us all with **Immediate CoCo Community**. Check it out today. After all, you can sample it for free!

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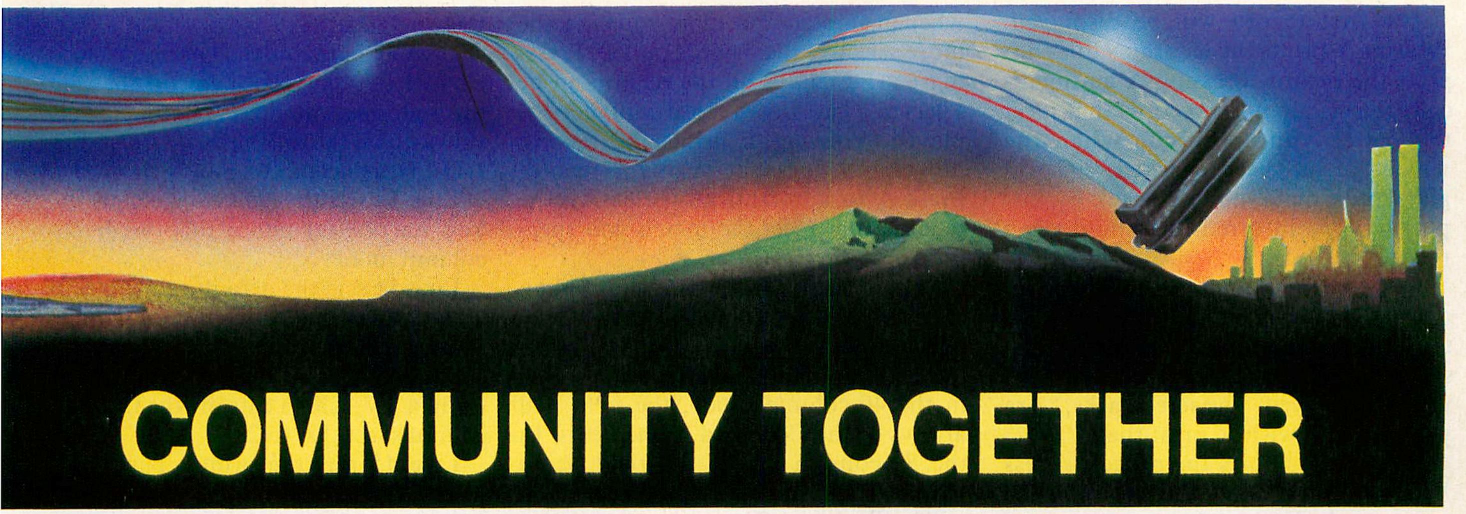
DELPHI TYPE:

GROUP COCO



COMMUNITY TOGETHER

How to reach RAINBOW's Color Computer SIG . . .

There are several ways to connect to Delphi and THE RAINBOW's CoCo SIG. In most cities you will not even have to pay long distance charges; you can use special data communications networks like Telenet, Tymnet and the Canadian Datapac network.

First, set your terminal program to operate at either 300 or 1200 Baud (depending on the modem you have), and also select either 7 bits with even parity or 8 bits with no parity, and one stop bit. (If one combination doesn't work, try another.)

Decide which network you should use. There is no surcharge for Telenet or Tymnet. Canadian residents using Datapac will be charged an additional $10.80 (U.S.) per hour.

On Telenet: Uninet network has merged with Telenet. To get the Telenet number for your area, call (800) 336-0437. After you call the local access number and make connection, press ENTER twice. When the "TERMINAL=" prompt appears, press ENTER again. When the "@" prompt appears, type `C DELPHI` and press ENTER.

On Tymnet: Call (800) 336-0149 to get the Tymnet number for your area. After you dial your designated number and connect, you will see either "garbage" or a message saying "please type your terminal identifier." At this point, even if the screen is garbled, simply press 'A'. When "please log in:" appears, type `DELPHI` and press ENTER.

From Canada (on Datapac): Call Delphi Customer Service at (617) 491-3393 to get the Datapac number for your area. After you connect, press the period key (.) and ENTER (use two periods if you're using 1200 Baud). Type `SET 2:1, 3:126` and press ENTER. Now type `p 1 3106, DELPHI;` and press ENTER. Delphi's new rates indicate an additional $10.80 hourly surcharge for evening use of Datapac, which means a total of $18 (U.S.) for connect time.

From other countries: Many countries have their own data networks that can connect to either Telenet or Tymnet. Check with the telephone authorities in your country for details on how to sign up for this service. When you have an account set up, you can reach Delphi with a "host code" of 3110 6170 3088 through Telenet, or 3106 90 6015 through Tymnet. (You'll have to pay the toll charges for this connection.)

Type in Your Username

If you're already a subscriber to THE RAINBOW, at the "USERNAME:" prompt, type `JOINDELPHI` and press ENTER. At the "PASSWORD:" prompt, type `RAINBOW`. Then, at the "NUMBER:" prompt, type your individual subscription number from the mailing label of your latest issue of THE RAINBOW. (If there are one or more zeros at the beginning of this number, include them.)

If you don't already have a subscription, at the "USERNAME:" prompt, type `JOINDELPHI` and press ENTER. At the "PASSWORD:" prompt, type `SENDRAINBOW` and press ENTER. Have your MasterCard, VISA or American Express card ready, because you'll be led through a series of questions that will enable us to put your RAINBOW and Delphi subscriptions into effect. In an effort to hold down non-editorial costs, we do not bill for subscriptions.

If you make a typing error, just use Control-X and start over. Remember that at any point, when you're on Delphi, you can type `HELP` to get help on how to use the system. To get off the system just type `BYE`.

If you find that you're unable to log on to Delphi and enter the CoCo SIG after following these instructions, call us during afternoon business hours at (502) 228-4492. We'll be glad to offer assistance.

Come Visit Us! Type: `GROUP COCO`

After you sign in, you'll be prompted to set up your own, personal "user name" — Delphi is a friendly service, no numbers to remember — and you'll be asked a number of questions so Delphi can set up your account. You'll also be assigned a temporary password.

Delphi will tell you that your account will be ready after 6 p.m. the same day if you sign up before noon (Eastern time zone.) If not, your account will be ready at 6 p.m. the next day. Once an account is verified and opened, *each RAINBOW subscriber will be credited with an hour of free time!*

When you log back in, use your chosen username and your temporary password to access the system. At that point, you will meet Max, who will help you configure things and will change your temporary password into your own *personal* password. This is the password you will use for subsequent sessions — or until you change it.

After Max bids you goodbye, you'll wind up at the Delphi Main Menu; type in `GROUP COCO` and **join us on the CoCo SIG!**

The first record will be displayed. Pressing Y prints the record; N does not print the record. Pressing A automatically selects all of the records that meet the match you specified. When the whole file has been checked, *PO* will give you a quick double-check by displaying key information about each record.

In the 40-column mode, the field will always be the Code and Name fields. In the 80-column mode, the field being searched and a randomly chosen field will be displayed. The screen asks, "Are you sure you wish to print these?"

Pressing N aborts the process. Press Y, and *PO* will write the letters to the printer substituting the proper names for `.FN.` and `.LN.`. For example:

Dear Orman,

I see by my own records that you are eligible for a special discount. If I can be of any service to you Mr. Beckles, please let me know.

After the last letter is printed, the main menu will appear.

Printing Routines

Select P for Print. The screen displays our familiar nine fields and the default. Specify the field you want to search by pressing its number.

Enter the string you are searching for when prompted. The more you type, the more selective the records pulled. Pressing ENTER causes all the records to be selected. The first record will be displayed. Pressing Y prints the record; pressing N does not print the record. Press A to automatically select all the records that meet the match you specified.

When the whole file has been checked', the program will give you a quick double-check by displaying key information about each record. Again, in the 40-column mode, the field will always be the Code and Name fields. In the 80-column mode, the field being searched and a randomly chosen field will be displayed. The screen then shows you the number of fields marked for printing and asks if you are sure you want to print them.

Pressing N aborts the process. Pressing Y causes *PO* to print out mailing labels. When *PO* is finished, the main menu will appear.

Error Trapping

PO can cope with almost any error and will display a message to help solve the problem.

RAM Disk

I use *PO* on my RAM disks. I wrote a little program that copies the information onto the RAM disk, starts the program and copies it back onto a floppy when I'm done.

Parameters

Line 12 contains the speed-up poke. Change this line to '0' if you do not want the high speed mode. *PO* automatically slows down the machine whenever disk I/O Errors occur.

Line 13 sets the default screen width. You may select either the 40- or 80-column mode.

Line 14 sets the default tab width. If you are using the 80-column mode, set this to 20. If you are using the 40-column mode, set this to 0. If you are using a TV, which cuts off the first two columns, set this to 2.

Line 15 sets the printer baud rate. Enter `POKE 150,1` for 9600 baud, `POKE 150,87` for 600 baud, *etc.*

Line 16 sets the number of lines between labels. For most labels, this should be set to 2. Increase the number for larger labels.

Line 17 prints the country. Select whether you want the Country field to print (0=no, 1=yes).

Line 18 sets the default column start, and this should never be changed.

The Post Office has applications for both personal and business uses. Its ability to hold more than 900 addresses should make it more than adequate for most small business owners.

(Questions or comments regarding this program may be directed to the author at 45 Meridian St., Malden, MA 02148. Please enclose an SASE when writing for a response.) ☐

17	57	4160	46	6410	132
50	68	4245	6	6480	29
110	192	4330	160	6565	97
2060	186	4425	156	6645	106
2160	142	5045	237	7000	161
2250	236	5150	128	7090	215
2325	154	5235	90	7205	10
2425	153	5325	157	END	58
3105	145	6025	77		
4055	159	6235	221		

The listing: `POST`

```
1 '*******************************
*******
2 '**          The Post Office
    **
3 '**     By Orman Cyril Beckles
II    **
4 '**
    **
5 '**        (C) Copyright 1987
    **
6 '**
    **
7 '*******************************
*******
8 '
9 '
10 GOTO 6730:'
        <-- DOES A PCLEAR 1
11 RGB:CLEAR 2000:FILES 2,332:DI
M S(949):TZ=5:ON ERR GOTO 7210
12 HI=65497:'
        <-- HI SPEED POKE
13 W=80    :'
        <-- DEFAULT WIDTH
14 TB=20   :'
        <-- DEFAULT TAB
15 POKE 150,1:'
        <-- BAUD RATE
16 EL=2:'
        <-- # OF LINES BETWEEN
LABELS
17 PC=0:'
        <-- PRINT COUNTRY 0=NO
```

```
1=YES
18 DC=TB+13:'
        <-- DEFAULT COLUMN STAR
T
19 KK=1:'
        <-- KEY CLICK
20 WIDTH W:PALETTE 0,0:ON BRK GO
TO 20:CLS1:ATTR 1,0:CLS:GOSUB 61
00
25 LOCATE TB+6,6:PRINT"Number Of
 Free Records =";INT(FREE(0)*13)
30 GOSUB 6000:NF=LOF(1):LOCATE 0
,20:PRINT:CLOSE #1:LOCATE 0,7:PR
INTTAB(TB+6)"Number Of Used Reco
rds =";NF
35 LOCATE 0,12
40 PRINTTAB(TB+9)"<";:ATTR 3,0:P
RINT"A";:ATTR 1,0:PRINT">";:ATTR
 3,0:PRINT" ADD    Address(s)";:
ATTR 1,0:PRINT
45 PRINTTAB(TB+9)"<";:ATTR 3,0:P
RINT"D";:ATTR 1,0:PRINT"> ";:ATT
R 3,0:PRINT"DELETE Address(s)";:
ATTR 1,0:PRINT
50 PRINTTAB(TB+9)"<";:ATTR 3,0:P
RINT"E";:ATTR 1,0:PRINT">";:ATTR
 3,0:PRINT" EDIT   Address(s)";:
ATTR 1,0:PRINT
55 PRINTTAB(TB+9)"<";:ATTR 3,0:P
RINT"F";:ATTR 1,0:PRINT">";:ATTR
 3,0:PRINT" FORM   Letter(s)";:
ATTR 1,0:PRINT
60 PRINTTAB(TB+9)"<";:ATTR 3,0:P
RINT"P";:ATTR 1,0:PRINT">";:ATTR
 3,0:PRINT" PRINT  Routine(s)";:
ATTR 1,0:PRINT
65 PRINTTAB(TB+9)"<";:ATTR 3,0:P
RINT"X";:ATTR 1,0:PRINT">";:ATTR
 3,0:PRINT" EXIT FROM PROGRAM";:
ATTR 1,0:PRINT
70 LOCATE 0,22:ATTR 3,2:PRINTTAB
(TB+3)"By Orman Cyril Beckles II
  (C) 1987":ATTR 1,0:PRINTCHR$(8
)
75 GOSUB 7190
80 IF IK$="A" THEN 1000:' <-- "A
DD" MODULE
85 IF IK$="D" THEN 2000:' <-- "D
EL" MODULE
90 IF IK$="E" THEN 3000:' <-- "E
DT" MODULE
95 IF IK$="F" THEN 4000:' <-- "F
OM" MODULE
100 IF IK$="P" THEN 5000:' <-- "
PRT" MODULE
105 IF IK$="X" THEN 6725:' <-- "
XIT"
110 GOTO 75
```

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"I cannot imagine the CoCo 3 without ADOS-3; it would not be a complete machine."
The RAINBOW, July 1987

You've moved up to a CoCo 3. A powerful new machine. Now, it's time to give BASIC a shot in the arm, with ADOS-3. Wouldn't it be nice to turn on your machine and be greeted by an 80-column display, in the colors of your choice, with your own custom startup message? To run routinely at 2 MHz (double speed) without having to slow down for disk and printer operations? This and much, much more is possible with ADOS-3, our CoCo 3 adaptation of the acclaimed original ADOS, which shares the original's virtual 100% compatibility with commercial software. After customizing ADOS-3 using the provided configuring utility, you can have it burned into an EPROM that plugs into the Disk BASIC ROM socket, or just use it in RAM as a disk utility. (EPROM + burning will cost $15-20; we provide information concerning how you can have this done.) Supports double-sided drives (35, 40, or 80 tracks). FAST and SLOW commands, auto line number prompts, RUNM command, keystroke macros, arrow-key scroll through BASIC programs, auto-edit of error line, and many more valuable features.

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```
1000 ON BRK GOTO 12:'
 <-- START OF ADD MODULE
1005 GOSUB 6100
1010 GOSUB 6500
1015 GOSUB 6000:GOSUB 6015
1020 IF AD(1)=1 AND LEN(V$(4))>1
 AND LEN(V$(5))>1 THEN  AD(1)=0:
FL(3)=1:GOSUB 7150:GOSUB 7110
1025 GOTO 1000
2000 ON BRK GOTO 12:FL(1)=1:'
 <-- START OF DELETE MODULE
2005 GOSUB 6100:GOSUB 6200
2010 LOCATE 0,21
2015 PRINTTAB(TB+11)"PLEASE SELE
CT FIELD"
2020 PRINTTAB(TB+2)"-> Where del
etetion can be found <-"
2025 GOSUB 7190
2030 A=VAL(IK$)
2035 GOSUB 6100
2040 PRINTTAB(TB+8)"ENTER STRING
 TO DELETE"
2045 PRINT
2050 PRINTTAB(TB+10)"->";:LINEIN
PUT SD$:GOSUB 6100
2055 GOSUB 6000
2060 FOR T=1 TO LOF(1)
2065 POKE (HI-1),0:GET #1,T:POKE
 HI,0
2070 S(T)=0
2075 GOSUB 6400
2080 IF FL(2)=1 THEN FL(2)=0:GOS
UB 2100:GOTO 2085
2085 NEXT T
2090 POKE (HI-1),0:CLOSE #1:POKE
 HI,0
2095 GOTO 2190
2100 LOCATE 0,9
2105 PRINTTAB(TB)"         CODE:";
DC$
2110 PRINTTAB(TB)"         NAME:";
DN$
2115 PRINTTAB(TB)"     ADDRESS:";
DA$
2120 PRINTTAB(TB)"         CITY:";
DY$
2125 PRINTTAB(TB)"        STATE:";
DS$
2130 PRINTTAB(TB)"          ZIP:";
DZ$
2135 PRINTTAB(TB)"TELEPHONE #:";
DT$
2140 PRINTTAB(TB)"    F,L NAME:";
DF$
2145 PRINTTAB(TB)"     COUNTRY:";
DO$
2150 IF FL(1)=1 THEN GOTO 2165
2155 S(T)=1
2160 RETURN
2165 GOSUB 7190
2170 IF IK$="Y" OR IK$="y" THEN
2155
2175 IF IK$="N" OR IK$="n" THEN
2160
2180 IF IK$="A" OR IK$="a" THEN
FL(1)=0:GOTO 2150
2185 GOTO 2165
2190 'DOUBLE CHECK OF DELETES
2195 GOSUB 6100
2200 LOCATE 0,6:PRINTTAB(TB+14)"
DELETIONS"
2205 CV=9:C=1
2210 GOSUB 6000
2215 FOR T=1 TO LOF(1)
2220 IF S(T)=1 THEN 2225 ELSE 22
90
2225 POKE (HI-1),0:GET #1,T:POKE
 HI,0
2230 CV=CV+1
2235 IF CV>21 THEN CV=9
2240 LOCATE 0,7:PRINTTAB(TB+8)"M
ARKED FOR DELETIONS=";C:C=C+1:LO
CATE 1,CV
2245 IF A=1  OR A=0 THEN PRINT T
AB(TB+5)A$;" ";B$
2250 IF A=2 THEN PRINT TAB(TB+5)
 DN$;" ";DC$
2255 IF A=3 AND W=80 THEN PRINTT
AB(18) DA$;" ";DN$ ELSE IF A=3 T
HEN PRINTTAB(2)C$;" "; DC$
2260 IF A=4 AND W=80 THEN PRINT
DY$;" "; DN$ ELSE IF A=4 THEN PR
INT DY$;" ";DC$
2265 IF A=5 THEN PRINT DS$;" ";D
N$
2270 IF A=6 THEN PRINT DZ$;" ";D
N$
2275 IF A=7  AND W=80 THEN PRINT
 DT$;" "; DN$ ELSE IF A=7 THEN P
RINT DT$;" "; DC$
2280 IF A=8 AND W=80 THEN PRINT
DF$;" "; DN$ ELSE IF A=8 THEN PR
INT DF$;" "; DC$
2285 IF A=9 AND W=80 THEN PRINT
DO$;" "; DN$ ELSE IF A=9 THEN PR
INT DO$;" "; DC$
2290 NEXT T
2295 POKE(HI-1),0:CLOSE#1:POKE H
I,0
2300 T=21-CV:FOR Y=1 TO T:LOCATE
 1,CV+T:PRINT:NEXT Y:PRINTTAB(TB
+4)"DO YOU REALY WANT TO ERASE T
HESE";
2305 GOSUB 7190
2310 IF IK$="Y" THEN 2325
2315 IF IK$="N" THEN STOP
2320 GOTO 2305
2325 GOSUB 6100:PRINTTAB(TB+8)"*
 Busy Deleting Records *":GOSUB
6000
2330 POKE (HI-1),0:OPEN "D",#2,"
TEMP.FIL",166:POKE HI,1
```

```
2335 FIELD #2, 10 AS J$,25 AS K$
,25 AS L$,25 AS M$,10 AS N$,7 AS
 O$,14 AS P$,25 AS Q$,25 AS R$
2340 FOR T=1 TO LOF(1)
2345 IF S(T)=1 THEN 2405
2350 F=F+1:POKE (HI-1),0:GET #1,
T:POKE HI,0
2355 LSET J$=DC$
2360 LSET K$=DN$
2365 LSET L$=DA$
2370 LSET M$=DY$
2375 LSET N$=DS$
2380 LSET O$=DZ$
2385 LSET P$=DT$
2390 LSET Q$=DF$
2395 LSET R$=DO$
2400 POKE (HI-1),0:PUT #2,F:POKE
 HI,0
2405 S(T)=0:NEXT T
2410 CLOSE #1
2415 CLOSE #2
2420 POKE (HI-1),0:KILL"MAILER.F
IL":POKE HI,0
2425 POKE (HI-1),0:RENAME "TEMP.
FIL" TO "MAILER.FIL":POKE HI,0
2430 GOTO 12
3000 ON BRK GOTO 12:FL(2)=0:' ED
IT MODULE
3005 GOSUB 6100:GOSUB 6200
3010 LOCATE 0,21
3015 PRINTTAB(TB+11)"PLEASE SELE
CT FIELD"
3020 PRINTTAB(TB+2)"-> Where edi
t string can be found <-"
3025 GOSUB 7190
3030 A=VAL(IK$)
3035 GOSUB 6100
3040 PRINTTAB(TB+10)"ENTER STRIN
G TO EDIT"
3045 PRINT
3050 PRINTTAB(TB+12)"->";:LINEIN
PUT SD$:IF SD$="" THEN SD$=" "
3055 GOSUB 6000:'OUTPUT ROUTINE
3060 FOR NR=1 TO LOF(1)
3065 POKE (HI-1),0:GET #1,NR:POK
E HI,0
3070 S(T)=0
3075 GOSUB 6400
3080 IF FL(2)=1 THEN FL(2)=0:GOT
O 3105
3085 GOTO 3125
3090 POKE (HI-1),0:CLOSE #1:POKE
 HI,0
3095 GOTO 12
3100 GOTO 5280
3105 GOSUB 6100
3110 V$(1)=DC$:V$(2)=DN$:V$(3)=D
A$:V$(4)=DY$:V$(5)=DS$:V$(6)=DZ$
:V$(7)=DT$:V$(8)=DF$:V$(9)=DO$
3115 GOSUB 6500
3120 LSET DC$=V$(1):LSET DN$=V$(
```

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```
2):LSET DA$=V$(3):LSET DY$=V$(4)
:LSET DS$=V$(5):LSET DZ$=V$(6):L
SET DT$=V$(7):LSET DF$=V$(8):LSE
T DO$=V$(9):PUT #1,NR
3125 NEXT NR
3130 GOTO 3090
4000 ON BRK GOTO 12:FL(1)=1:' <-
- START OF FORM MODULE
4005 GOSUB 6100:GOSUB 6200
4010 LOCATE 0,19
4015 PRINTTAB(TB+11)"PLEASE SELE
CT FIELD"
4020 PRINTTAB(TB+2)" Where print
-out string can be found "
4025 GOSUB 7190
4030 A=VAL(IK$)
4035 GOSUB 6100:LOCATE 0,7
4040 PRINTTAB(TB+10)"ENTER STRIN
G TO PRINT"
4045 PRINT
4050 PRINTTAB(TB+12)"->";:LINEIN
PUT SD$:IF SD$="" THEN SD$=" "
4055 LOCATE 0,11:PRINTTAB(TB+8)"
ENTER NAME OF LETTER FILE"
4060 PRINT:PRINTTAB(TB+12)"->";:
LINEINPUT LF$
4065 IF LF$="" THEN 4055
4070 GOSUB 6000:'  <-- OUTPUT RO
UTINE
4075 FOR T=1 TO LOF(1)
4080 POKE (HI-1),0:GET #1,T:POKE
 HI,0
4085 S(T)=0
4090 GOSUB 6400
4095 IF FL(2)=1 THEN FL(2)=0:GOS
UB 4115:GOTO 4100
4100 NEXT T
4105 POKE (HI-1),0:CLOSE #1:POKE
 HI,0
4110 GOTO 4160
4115 LOCATE 0,7:GOSUB 6255
4120 IF FL(1)=1 THEN GOTO 4135
4125 S(T)=1
4130 RETURN
4135 GOSUB 7190
4140 IF IK$="Y" OR IK$="y" THEN
4125
4145 IF IK$="A" OR IK$="a" THEN
FL(1)=0:GOTO 4120
4150 IF IK$="N" OR IK$="n" THEN
4130
4155 GOTO 4135
4160 '  <-- DOUBLE CHECK OF DELE
TES
4165 GOSUB 6100
4170 LOCATE 0,6:PRINTTAB(TB+13)"
 PRINT-OUT"
4175 CV=9:C=1
4180 GOSUB 6000
4185 FOR T=1 TO LOF(1)
4190 IF S(T)=1 THEN 4195 ELSE 42
60
4195 POKE (HI-1),0:GET #1,T:POKE
 HI,0
4200 CV=CV+1
4205 IF CV>21 THEN CV=9
4210 LOCATE 0,7:PRINTTAB(TB+8)"M
ARKED FOR PRINTING=";C:C=C+1:LOC
ATE 1,CV
4215 IF A=1  OR A=0 THEN PRINT T
AB(TB+5) DC$;" ";DN$
4220 IF A=2 THEN PRINT TAB(TB+5)
 DN$;" ";DC$
4225 IF A=3 AND W=80 THEN PRINTT
AB(18) DA$;" "; DN$ ELSE IF A=3
THEN PRINTTAB(2)DA$;" ";DC$
4230 IF A=4 AND W=80 THEN PRINT
DY$;" "; DN$ ELSE IF A=4 THEN PR
INT DY$;" "; DC$
4235 IF A=5 THEN PRINT DS$;" ";D
N$
4240 IF A=6 THEN PRINT DZ$;" ";D
N$
4245 IF A=7  AND W=80 THEN PRINT
 DT$;" "; DN$ ELSE IF A=7 THEN P
RINT DT$;" "; DC$
4250 IF A=8 AND W=80 THEN PRINT
DF$;" "; DN$ ELSE IF A=8 THEN PR
INT DF$;" "; DC$
4255 IF A=9 AND W=80 THEN PRINT
DO$;" "; DN$ ELSE IF A=9 THEN PR
INT DO$;" "; DC$
4260 NEXT T
4265 POKE (HI-1),0:CLOSE#1:POKE
HI,0
4270 T=21-CV:FOR Y=1 TO T:LOCATE
 1,CV+T:PRINT:NEXT Y:PRINTTAB(TB
+0)"ARE YOU SURE YOU WISH TO PRI
NT THESE";
4275 GOSUB 7190
4280 IF IK$="Y" THEN 4295
4285 IF IK$="N" THEN 4000
4290 GOTO 4275
4295 CLS
4300 GOSUB 6100:PRINTTAB(TB+10)"
Working..."
4305 GOSUB 6000
4310 FOR T=1 TO LOF(1)
4315 IF S(T)=1 THEN 4320 ELSE 44
80
4320 POKE (HI-1),0:GET #1,T:POKE
 HI,0
4325 GOSUB 4345
4330 POKE HI-1,0:PRINT#-2,CHR$(1
2):POKE HI,0:'<-- EJECTS A PAGE
4335 NEXT T
4340 CLOSE #1:GOTO 12
4345 P=INSTR(DF$,","):RF$=LEFT$(
DF$,P-1):FOR TF=P TO 25:IF MID$(
DF$,TF,1)<>CHR$(32) THEN FC=FC+1
:NEXT TF
4350 RL$=MID$(DF$,P+1,FC-1)
```

```
4355 L=LEN(RF$):R1$=RF$:GOSUB 44
30:RF$=R1$:L=LEN(RL$):R1$=RL$:GO
SUB 4430:RL$=R1$
4360 OPEN"I",#2,LF$
4365 IF EOF(2)=-1 THEN CLOSE #2:
RETURN
4370 LINE INPUT #2,IL$
4375 P=INSTR(IL$,".FN."):IF P>0
THEN 4395
4380 P=INSTR(IL$,".LN."):IF P>0
THEN 4425
4385 POKE HI-1,0:PRINT #-2, IL$:
POKE HI,0
4390 GOTO 4365
4395 ' FOUND .FN.
4400 MID$(IL$,P,4)="    "
4405 P1$=MID$(IL$,1,P-1)
4410 P2$=MID$(IL$,P+4,LEN(IL$))
4415 IL$=P1$+RF$+P2$
4420 GOTO 4375
4425 MID$(IL$,P,4)="    ":P1$=MI
D$(IL$,1,P-1):P2$=MID$(IL$,P+4,L
EN(IL$)):IL$=P1$+RL$+P2$:GOTO 43
80
4430 FOR U=1 TO LEN(R1$)
4435 C$=MID$(R1$,U,1)
4440 IF U=1 THEN 4465
4445 IF ASC(C$)<91 AND ASC(C$)>6
4 THEN C=ASC(C$)+32:C$=CHR$(C)
4450 MID$(R1$,U,1)=C$
4455 NEXT U
4460 RETURN
4465 'FIRST LETTER
4470 IF ASC(C$)>96 THEN C=ASC(C$
)-32:C$=CHR$(C)
4475 GOTO 4450
4480 NEXT T
4485 POKE (HI-1),0:CLOSE #1:POKE
 HI,0
4490 GOTO 12
5000 ON BRK GOTO 12:FL(1)=1:' <-
- START OF PRINT MODULE
5005 GOSUB 6100:GOSUB 6200
5010 LOCATE 0,19
5015 PRINTTAB(TB+11)"PLEASE SELE
CT FIELD"
5020 PRINTTAB(TB+2)" Where print
-out string can be found "
5025 GOSUB 7190
5030 A=VAL(IK$)
5035 GOSUB 6100:LOCATE 0,7
5040 PRINTTAB(TB+10)"ENTER STRIN
G TO PRINT"
5045 PRINT
5050 PRINTTAB(TB+12)"->";:LINEIN
PUT SD$:IF SD$="" THEN SD$=" "
5055 GOSUB 6000
5060 FOR T=1 TO LOF(1)
```

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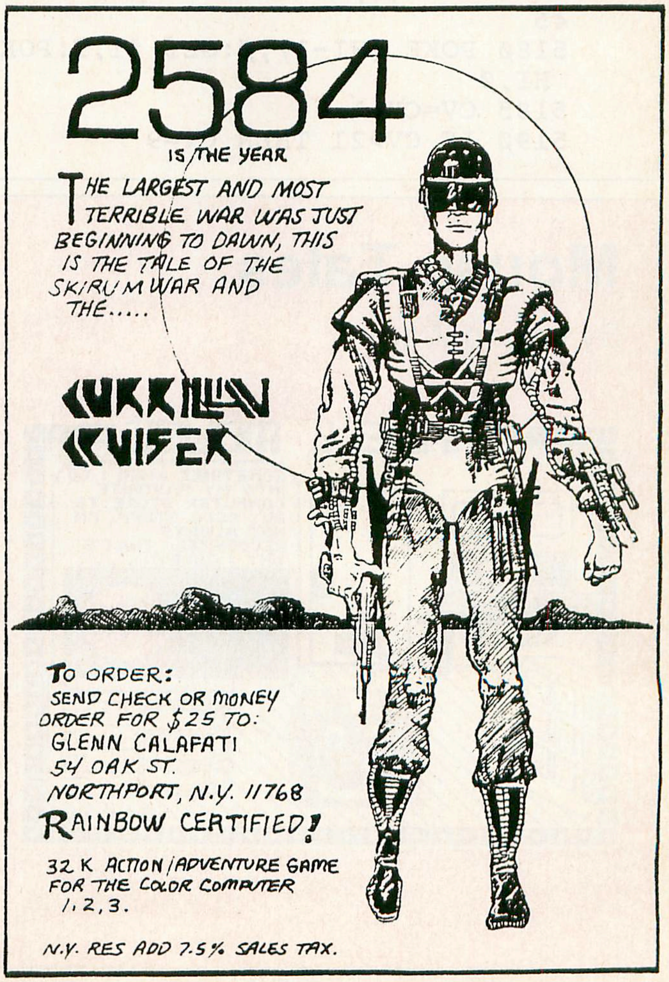

2584 IS THE YEAR THE LARGEST AND MOST TERRIBLE WAR WAS JUST BEGINNING TO DAWN, THIS IS THE TALE OF THE SKIRUM WAR AND THE.....

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32 K ACTION/ADVENTURE GAME FOR THE COLOR COMPUTER 1, 2, 3.

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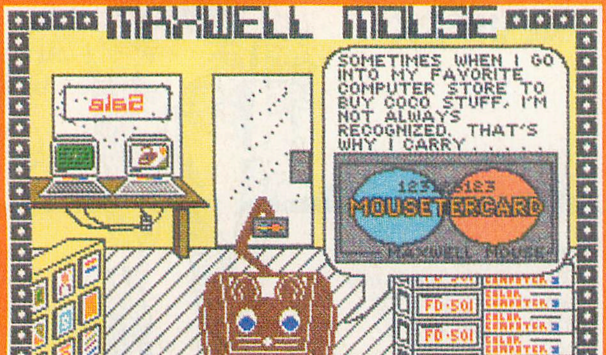
```
5065 POKE (HI-1),0:GET #1,T:POKE
 HI,0
5070 S(T)=0
5075 GOSUB 6400
5080 IF FL(2)=1 THEN FL(2)=0:GOS
UB 5100:GOTO 5085
5085 NEXT T
5090 POKE (HI-1),0:CLOSE #1:POKE
 HI,0
5095 GOTO 5145
5100 LOCATE 0,7:GOSUB 6255
5105 IF FL(1)=1 THEN GOTO 5120
5110 S(T)=1
5115 RETURN
5120 GOSUB 7190
5125 IF IK$="Y" OR IK$="y" THEN
5110
5130 IF IK$="A" OR IK$="a" THEN
FL(1)=0:GOTO 5105
5135 IF IK$="N" OR IK$="n" THEN
5115
5140 GOTO 5120
5145 'DOUBLE CHECK OF DELETES
5150 GOSUB 6100
5155 LOCATE 0,6:PRINTTAB(TB+13)"
 PRINT-OUT"
5160 CV=9:C=1
5165 GOSUB 6000
5170 FOR T=1 TO LOF(1)
5175 IF S(T)=1 THEN 5180 ELSE 52
45
5180 POKE (HI-1),0:GET #1,T:POKE
 HI,0
5185 CV=CV+1
5190 IF CV>21 THEN CV=9
5195 LOCATE 0,7:PRINTTAB(TB+8)"M
ARKED FOR PRINTING=";C:C=C+1:LOC
ATE 1,CV
5200 IF A=1  OR A=0 THEN PRINT T
AB(TB+5) DC$;" "; DN$
5205 IF A=2 THEN PRINT TAB(TB+5)
 DN$;" ";DC$
5210 IF A=3 AND W=80 THEN PRINTT
AB(18) DA$;" ";DN$ ELSE IF A=3 T
HEN PRINTTAB(2) DA$;" "; DC$
5215 IF A=4 AND W=80 THEN PRINT
DY$;" ";DN$ ELSE IF A=4 THEN PRI
NT DY$;" ";DC$
5220 IF A=5 THEN PRINT DS$;" ";D
N$
5225 IF A=6 THEN PRINT DZ$;" ";D
N$
5230 IF A=7 AND W=80 THEN PRINT
DT$;" ";DN$ELSE IF A=7 THEN PRIN
T DT$;" ";DC$
5235 IF A=8 AND W=80 THEN PRINT
DF$;" ";DN$ ELSE IF A=8 THEN PRI
NT DF$;" ";DC$
5240 IF A=9 AND W=80 THEN PRINT
DO$;" ";DN$ ELSE IF A=9 THEN PRI
NT DO$;" ";DC$
5245 NEXT T
5250 POKE (HI-1),0:CLOSE#1:POKE
HI,0
5255 T=21-CV:FOR Y=1 TO T:LOCATE
 1,CV+T:PRINT:NEXT Y:PRINTTAB(TB
+0)"ARE YOU SURE YOU WISH TO PRI
NT THESE"
5260 GOSUB 7190
5265 IF IK$="Y" THEN 5280
5270 IF IK$="N" THEN GOTO 5000
5275 GOTO 5260
5280 CLS
5285 PRINT"WORKING .";
5290 GOSUB 6000
5295 FOR T=1 TO LOF(1)
5300 IF S(T)=1 THEN 5305 ELSE 53
65
5305 POKE (HI-1),0:GET #1,T
5310 F=0:TF=0:POKE (HI-1),0
5315 TF=TF+1:CC$=MID$(DY$,TF,1):
IF CC$=CHR$(32) THEN F=F+1
5320 IF TF=25 OR F=2 THEN 5330
5325 GOTO 5315
5330 IF TF=25 THEN T$=DY$ :GOTO
5335 ELSE T$=LEFT$(DY$,TF)
5335 PRINT#-2,DN$
5340 PRINT#-2,DA$
5345 PRINT#-2,T$;", ";DS$
5350 PRINT#-2,DZ$
5355 IF PC=1 THEN EL=EL-1:PRINT#
-2,DO$
5360 FOR TT=1 TO EL:PRINT#-2," "
:NEXT TT
5365 NEXT T
5370 POKE (HI-1),0:CLOSE #1:POKE
```

Mouse Tales

By Logan Ward


MAXWELL MOUSE
SOMETIMES WHEN I GO INTO MY FAVORITE COMPUTER STORE TO BUY COCO STUFF, I'M NOT ALWAYS RECOGNIZED. THAT'S WHY I CARRY
MOUSETERCARD
MAXWELL MOUSE
FD-501
COLOR COMPUTER
© L.W. 1986

```
 HI,0
5375 GOTO 12
5380 '
5385 '
5390 '-- END OF PRINT ROUTINE --
6000 '-- START OUTPUT ROUTINE --
6005 CLOSE#1:POKE (HI-1),0:LOCAT
E 0,20:ATTR 3,0,B:PRINTTAB(TB+6)
"PLEASE WAIT - ACCESSING DISK";:
ATTR 1,0:OPEN "D",#1,"MAILER.FIL
:0",166
6010 FIELD #1, 10 AS DC$,25 AS D
N$,25 AS DA$,25 AS DY$,10 AS DS$
,7 AS DZ$,14 AS DT$,25 AS DF$,25
 AS DO$:LOCATE 0,20:PRINT:RETURN
6015 LSET DC$=V$(1):LSET DN$=V$(
2):LSET DA$=V$(3):LSET DY$=V$(4)
:LSET DS$=V$(5)
6020 LSET DZ$=V$(6):LSET DT$=V$(
7):LSET DF$=V$(8):LSET DO$=V$(9)
6025 NR=LOF(1)+1
6030 POKE (HI-1),0:PUT #1,NR:POK
E HI,0
6035 POKE (HI-1),0:CLOSE #1:POKE
 HI,0
6040 LOCATE 0,20:PRINT
6045 RETURN
6100 '-- HEADER SUBROUTINE --
6105 CLS:ATTR 1,0:PRINTSTRING$(4
0+TB+TB,"*"):PRINTTAB(TB+12);:AT
TR 3,3:PRINT" The Post Office ";
:ATTR 1,0:PRINT:PRINT:PRINTSTRIN
G$(40+TB+TB,"*"):LOCATE 0,9:RETU
RN
6200 '-- HEADERS SUB-ROUTINE --
6205 LOCATE 0,7
6210 PRINTTAB(TB+10)"<1>. Code
            ONLY"
6215 PRINTTAB(TB+10)"<2>. Name
            ONLY"
6220 PRINTTAB(TB+10)"<3>. Addres
s           ONLY"
6225 PRINTTAB(TB+10)"<4>. City
            ONLY"
6230 PRINTTAB(TB+10)"<5>. State
            ONLY"
6235 PRINTTAB(TB+10)"<6>. Zip
            ONLY"
6240 PRINTTAB(TB+10)"<7>. Teleph
one         ONLY"
6245 PRINTTAB(TB+10)"<8>. First/
Last        ONLY"
6250 PRINTTAB(TB+10)"<9>. Countr
y           ONLY":PRINT:PRINTTAB(
TB)"Default-> <0>. ANY OF THE AB
OVE":RETURN
6255 'SUB ROUTINE 2
6260 PRINTTAB(TB+TZ)"        CODE
:";DC$
6265 PRINTTAB(TB+TZ)"        NAME
```

R.A.D. Products
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R.A.D. Products Presents TEXTFORM

Finally, a versitile text formatter is available for the Color Computer. TEXTFORM is compatible with all models with at least 64K, even the Color Computer III. This machine language program will format ASCII text files into two column pages quickly and easily. Text may be left unmodified, or simply insert special formatter commands for added control. TEXTFORM is a versitile enhancement to any word processing system whether you are a casual or professional user.

Software supports:
- Output to printer or disk
- Most popular printers
- Adjustable format parameters
- Columnar data
- Multiple page titles
- Optional page numbering
- Large files (up to a full disk)

TEXTFORM comes with complete documentation as well as sample format examples. Onscreen parameter display takes the guesswork out of format settings. Customized parameters may be saved to disk and reloaded for future use, thus eliminating mistakes and configuration time. Special printer codes and baud rate settings are software selectable. TEXTFORM is programmed in a high resolution environment which incorporates pull-down menus for ease of use. The software also supports auxilliary peripheral input from joysticks, mouse, touchpad, and high resolution input pack for added program control.

This is not another word processor. There are many fine word processors on the market for the Color Computer. TEXTFORM is a user defineable two column text formatter. If you are looking for a program which will allow your Color Computer to create professional looking documents without hours of tedious work, then TEXTFORM is the answer.

Ideal for:
- School newspapers
- Club newsletters
- Business reports
- Bulletins
- Advertisements
- Program listings
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System requirements:
- Color Computer (64K minimum)
- Disk drive
- Printer

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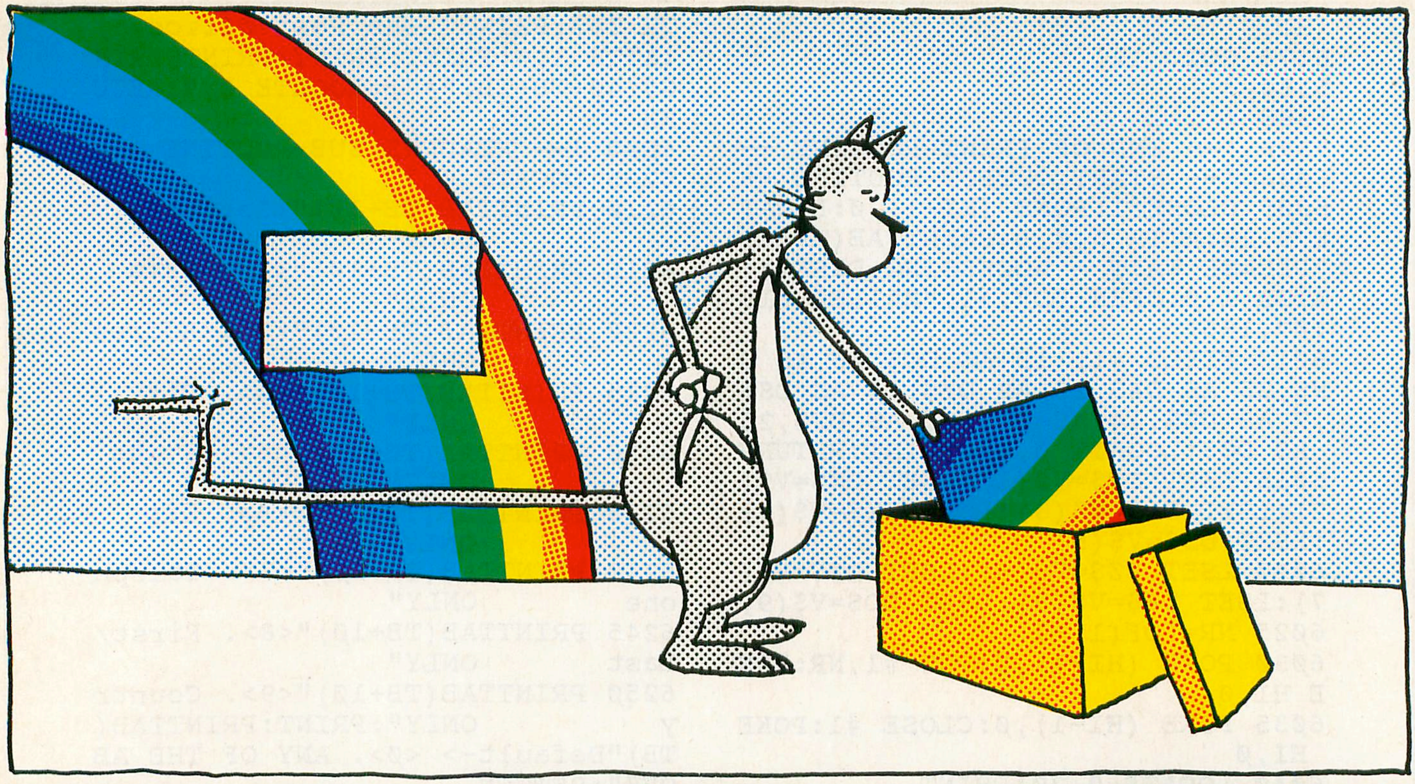

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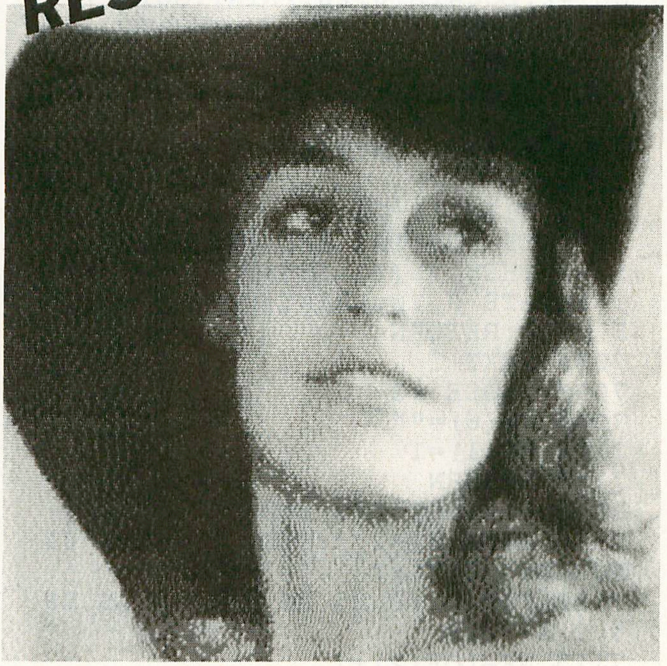

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V See pg30, APR88 RB for missing PGM lines 6485-6645.

```
:";DN$
6270 PRINTTAB(TB+TZ)"      ADDRESS
:";DA$
6275 PRINTTAB(TB+TZ)"         CITY
:";DY$
6280 PRINTTAB(TB+TZ)"        STATE
:";DS$
6285 PRINTTAB(TB+TZ)"          ZIP
:";DZ$
6290 PRINTTAB(TB+TZ)"TELEPHONE #
:";DT$
6295 PRINTTAB(TB+TZ)"    F,L NAME
:";DF$
6300 PRINTTAB(TB+TZ)"      COUNTRY
:";DO$
6305 RETURN
6400 '-- SEARCH SUB-ROUTINE --
6405 IF A=1 AND INSTR(DC$,SD$)>0
 THEN FL(2)=1:RETURN
6410 IF A=2 AND INSTR(DN$,SD$)>0
 THEN FL(2)=1:RETURN
6415 IF A=3 AND INSTR(DA$,SD$)>0
 THEN FL(2)=1:RETURN
6420 IF A=4 AND INSTR(DY$,SD$)>0
 THEN FL(2)=1:RETURN
6425 IF A=5 AND INSTR(DS$,SD$)>0
 THEN FL(2)=1:RETURN
6430 IF A=6 AND INSTR(DZ$,SD$)>0
 THEN FL(2)=1:RETURN
6435 IF A=7 AND INSTR(DT$,SD$)>0
 THEN FL(2)=1:RETURN
6440 IF A=8 AND INSTR(DF$,SD$)>0
 THEN FL(2)=1:RETURN
6445 IF A=9 AND INSTR(DO$,SD$)>0
 THEN FL(2)=1:RETURN
6450 IF A=0 AND INSTR(DC$,SD$)>0
 THEN FL(2)=1:RETURN
6455 IF A=0 AND INSTR(DN$,SD$)>0
 THEN FL(2)=1:RETURN
6460 IF A=0 AND INSTR(DA$,SD$)>0
 THEN FL(2)=1:RETURN
6465 IF A=0 AND INSTR(DY$,SD$)>0
 THEN FL(2)=1:RETURN
6470 IF A=0 AND INSTR(DS$,SD$)>0
 THEN FL(2)=1:RETURN
6475 IF A=0 AND INSTR(DZ$,SD$)>0
 THEN FL(2)=1:RETURN
6480 IF A=0 AND INSTR(DT$,SD$)>0
S$=MID$(S$,1,LEN(S$)-1):GOTO 663
0
6650 IF IK$=CHR$(13) OR IK$=CHR$
(10)  THEN GOTO 6680
6655 IF P=M-1 THEN 6630
6660 P=P+1
6665 S$=S$+IK$:LOCATE P,R:ATTR 3
,0:PRINT IK$;:ATTR 1,0
6670 IF P=M-1 THEN LOCATE P+1,R:
PRINT" ";:SOUND 1,1:GOTO 6630
6675 GOTO 6630
6680 IF S$<>"" THEN P=P+1:LOCATE
 P,R:PRINT
6685 RETURN
6690 GOSUB 7190
6695 GOSUB 6000
6700 DC$=CO$:LSET B$=NA$:LSET C$
=AD$:LSET D$=CI$:LSET E$=ST$:LSE
T F$=ZI$:LSET G$=TE$:LSET H$=FL$
:LSET I$=CN$
6705 NR=LOF(1)+1
6710 POKE (HI-1),0:PUT #1,NR:POK
E HI,0
6715 POKE (HI-1),0:CLOSE #1:POKE
 HI,0
6720 RETURN
6725 POKE (HI-1),0:POKE 113,0:EX
EC 40999:'<-- BREAK OUT FROM MAI
N MENU
6730 PCLEAR 1:RUN 11
7000 '-- BEGINNING OF INPUT LOOP
--
7005 LOCATE C,R:PRINTV$(VN):LOCA
TE C+L,R:PRINT:GOSUB 6605
7010 IF S$<>"" THEN V$(VN)=S$
7015 IF UA=1 THEN 7025
7020 RETURN
7025 UA=0
7030 IF S$<>"" THEN V$(VN)=S$
7035 GU=1:RETURN
7040 IF FL(3)=2 THEN FL(3)=0:RET
URN:'<-- ZIP CODE LOOKUP MODULE
7050 POKE (HI-1),0:OPEN "D",#2,"
ZIPCODES.FIL",42
7055 FIELD #2, 25 AS ZC$,10 AS Z
S$,7 AS ZZ$:IF LOF(2)=0 THEN CLO
SE #2:LOCATE 0,20:PRINT:GOTO 709
5
7060 FOR T=1 TO LOF(2)
7065 POKE (HI-1),0:GET #2,T:POKE
 HI,0
7070 BS=25-LEN(T1$):T$=STRING$(B
S," ")
7075 T1$=T1$+T$
7080 IF ZC$=T1$ AND INSTR(ZS$,T2
$)>0 THEN V$(6)=ZZ$:POKE (HI-1),
0:LOCATE 0,20:PRINT:CLOSE #2:POK
E HI,0:RETURN
7085 NEXT T
7090 CLOSE #2
7095 V$(6)=""
7100 AD(1)=1
7105 RETURN
7110 '-- ADD ZIP CODE TO FILE --
7115 POKE HI-1,0:OPEN "D",#2,"ZI
PCODES.FIL",42
7120 FIELD #2,25 AS ZC$,10 AS ZS
$,7 AS ZZ$
7125 NR=LOF(2)+1
7130 LSET ZC$=T1$:LSET ZS$=T2$:L
SET ZZ$=V$(6)
7135 PUT #2,NR
7140 CLOSE #2:POKE HI,0
7145 RETURN
```

```
7150 '
7155 IF FL(3)=1 AND LEN(V$(4))=0
 OR LEN(V$(5))=0 THEN FL(3)=2:RE
TURN
7160 IF FL(3)=1 THEN CV$=V$(4):G
OSUB 7165:T1$=CV$:CV$=V$(5):GOSU
B 7165:T2$=CV$:FL(3)=0:RETURN
7165 FOR L=1 TO LEN(CV$)
7170 LX$=MID$(CV$,L,1):LX=ASC(LX
$)
7175 IF LX>90 AND LX<123 THEN LX
=LX-32:MID$(CV$,L,1)=CHR$(LX)
7180 NEXT L
7185 RETURN
7190 '-- INKEY STRING SUB-ROUTIN
E --
7195 IK$=INKEY$:IF IK$="" THEN 7
195
7200 IF KK=1 THEN SOUND 200,1
7205 RETURN
7210 IF ERNO=26 AND ERLIN=4340 T
HEN CLS:GOSUB 6100:LOCATE 0,12:P
RINTTAB(TB)"** LETTER FILE REQUE
STED  NOT PRESENT **":LOCATE 0,2
0:PRINTTAB(TB+5)"** PRESS ANY KE
Y TO CONTINUE **":GOSUB 7190:GOT
O 12
7215 IF ERNO=20 AND ERLIN=6005 T
HEN GOSUB 6100:LOCATE 0,12:PRINT
TAB(TB+0)"** FILE: MAILER.FIL  H
AS AN I/O ERROR **":LOCATE 0,20:
PRINTTAB(TB+5)"** PRESS ANY KEY
TO CONTINUE **";:GOSUB 7190:GOTO
 12
7220 IF ERNO=20 AND ERLIN=12 THE
N GOSUB 6100:LOCATE 0,12 :PRINTT
AB(TB+0)"** IO ERROR ON DATA DIS
K PLEASE CHECK **":LOCATE 0,20:P
RINTTAB(TB+5)"** PRESS ANY KEY T
O CONTINUE **";:GOSUB 7190:GOTO
12
7225 IF ERNO=20 AND ERLIN=9545 T
HEN GOSUB 6100:LOCATE 0,12:PRINT
TAB(TB)   "** IO ERROR IN FILE ZI
PCODES  PLZ CHK **":LOCATE 0,20:
PRINTTAB(TB+5)"** PRESS ANY KEY
TO CONTINUE **";:GOSUB 7190:GOTO
 12
7230 IF ERNO=26 AND ERLIN=4355 T
HEN GOSUB 6100:LOCATE 0,12:PRINT
TAB(TB+2)"* NO LETTER FILE PRESE
NT ON DISK * ";:GOSUB 7190:GOTO
12
7231 IF ERNO=26 AND ERLIN=4360 T
HEN 20
7235 STOP
7240 A$=INKEY$:IF A$="" THEN 724
0
```

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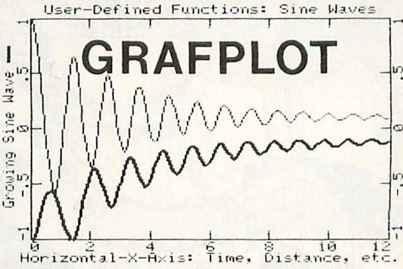

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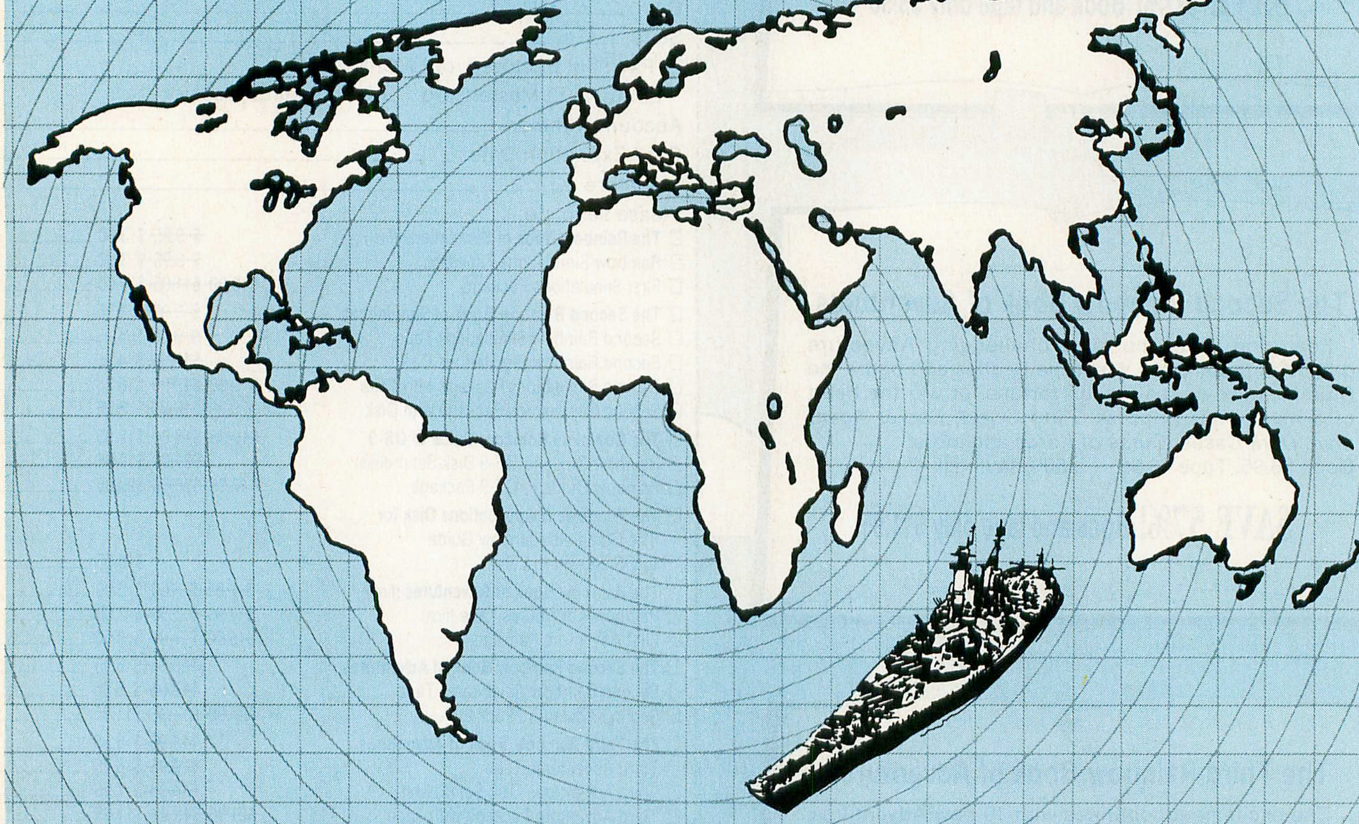
War under the waves

Sub Search

By Steven Sward



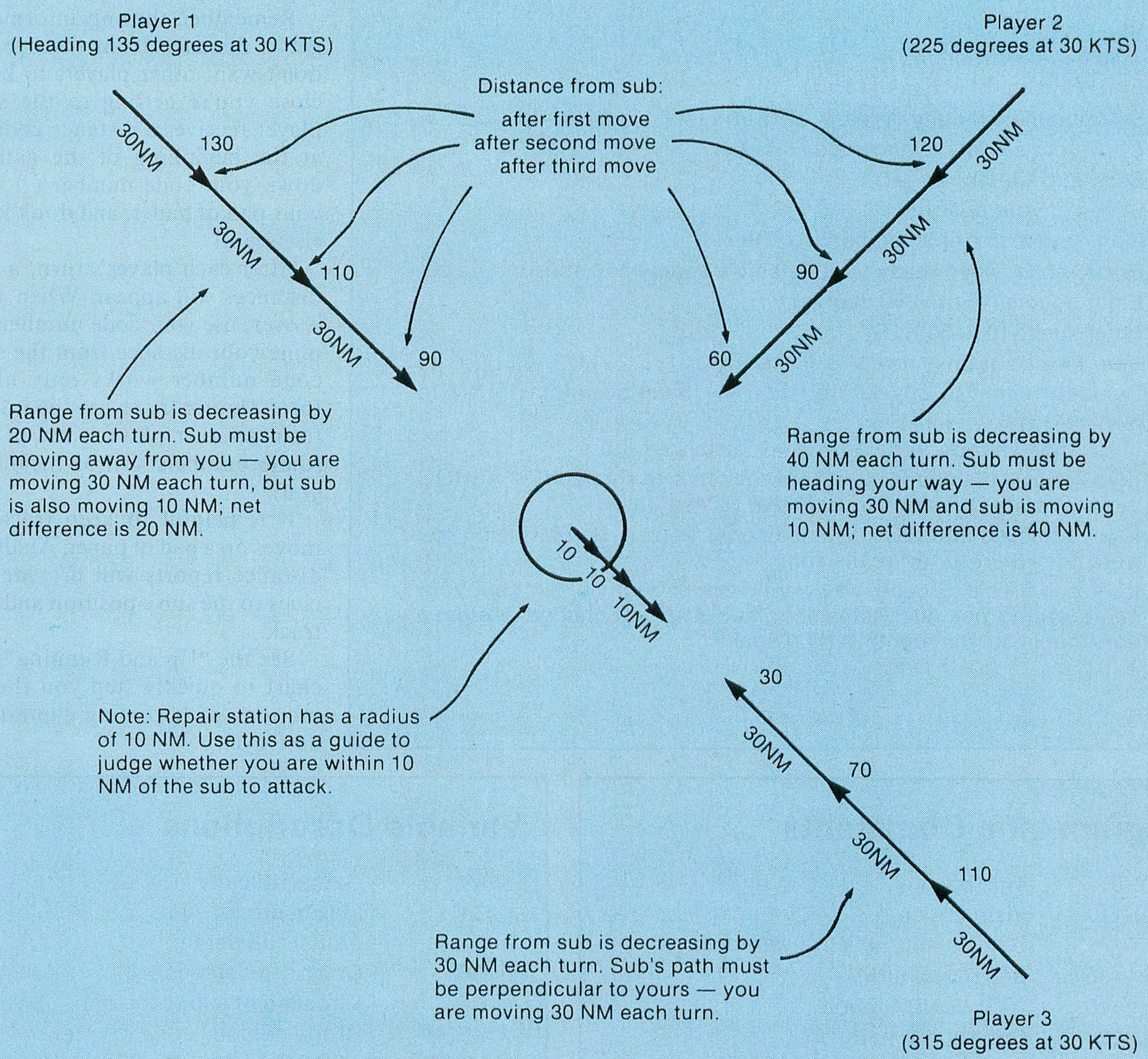
Sub Search is a challenging game of strategy for one to four players. Each player is the captain of a SPRUANCE class destroyer equipped with ASROCs (anti-submarine rockets). Your mission is to track down the enemy sub, approach to within 10 nautical miles (NM) and fire an ASROC set to the correct depth.

Your destroyer receives "Distance Only" information on the enemy sub. You must use this information to determine the sub's track and depth. The sub travels at 10 nautical miles per hour (10 knots) with a randomly selected depth (speed and depth remain constant throughout the game). The sub changes its course every seven to nine moves or any time it hits the reef (boundary) surrounding the playing area.

You select your destroyer's course (001 to 360 degrees) and speed (0 to 30 knots). Each ship has four ASROCs and two launchers. ASROCs have an effective range of 10 NM and a depth "kill zone" of plus or minus 25 feet.

Steve Sward is a major in the U.S. Air Force and is currently stationed at Castle AFB. He has been a Color Computer enthusiast since 1980. Steve, his wife, Carla, and their three children live in Merced, California.

Sample Situation After Three Moves


Player 1
(Heading 135 degrees at 30 KTS)
Player 2
(225 degrees at 30 KTS)
Player 3
(315 degrees at 30 KTS)
Distance from sub:
after first move
after second move
after third move
30NM
30NM
30NM
130
110
90
30NM
30NM
30NM
120
90
60
10
10
10NM
30
70
110
30NM
30NM
30NM

Range from sub is decreasing by 20 NM each turn. Sub must be moving away from you — you are moving 30 NM each turn, but sub is also moving 10 NM; net difference is 20 NM.

Range from sub is decreasing by 40 NM each turn. Sub must be heading your way — you are moving 30 NM and sub is moving 10 NM; net difference is 40 NM.

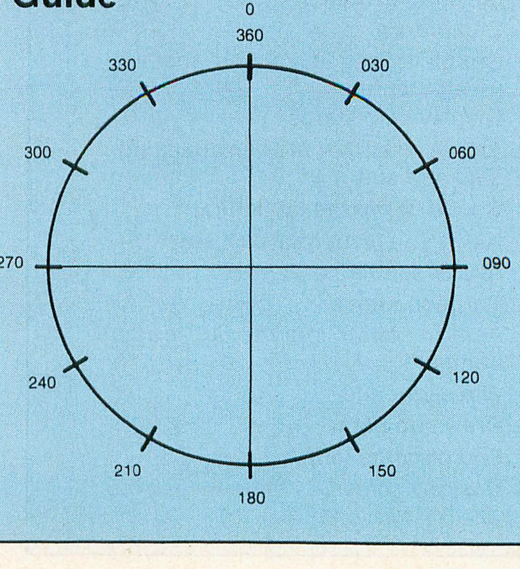
Note: Repair station has a radius of 10 NM. Use this as a guide to judge whether you are within 10 NM of the sub to attack.

Range from sub is decreasing by 30 NM each turn. Sub's path must be perpendicular to yours — you are moving 30 NM each turn.

If your ship is within 10 NM of the sub, and the sub is either 25 feet above or below the depth setting of your ASROC — you win! However, if you attack the sub within 10 NM but miss with the depth setting, the sub will reattack with a torpedo. To repair damage caused by torpedoes or to restock your supply of ASROCs, head for the red repair station in the center. Should you attack the sub farther than 10 NM away, nothing will happen; the sub will not retaliate — you will simply have wasted one or two missiles.

There are two difficulty options. The first option displays the sub's path, which is useful in becoming familiar with the game. The second option is the same except that the sub's path is concealed. When the sub is finally destroyed under Option 2, its path will

Compass Guide


0
360
030
060
090
120
150
180
210
240
270
300
330

be displayed for the curious. For the frustrated, there is an "I Give Up" feature, which will also display the sub's depth and path.

Remember, the only information you get is distance from the sub. As you don't want other players to know how close you're getting to the sub, each player receives a distance code number at the beginning of the game. Copy down your code number (1 to 10) on your pad of paper, and don't let anyone else see it!

After each player's turn, a list of 10 distances will appear. When your turn is over, use your code number to determine your distance from the sub. Your code number works only after your turn. *Do not* try to use the information from another player's list of 10 codes (these numbers will be meaningless to you).

It is helpful to keep track of your moves on a pad of paper. Analysis of the distance reports will provide valuable clues to the sub's position and heading/track.

See the "Up and Running" reference chart to quickly step you through the motions of becoming captain of your destroyer. ☐

Up and Running

1) Run program
2) Title page/instructions
3) Input number of players (1 to 4)
4) Select game difficulty (1=easy; 2=hard)
5) Copy your secret distance code number
6) Copy sub "depth range"
7) Status of your destroyer
8) Playing screen (repair station in center)
9) Press ENTER when ready to enter ship's course and speed
10) Enter course (001 to 360 degrees)
11) Enter speed (0 to 30 KTS)
12) Your new position is now >>>flickering<<<
13) Decide whether to attack sub (Y or N). (Must be within 10 NM to succeed)
14) If you didn't attack, write down your distance report
15) If you attacked, choose number of rockets and set depth — ASROC has kill zone of plus or minus 25 feet (50 feet total)
16) If you attacked and your distance codes appear, you missed! (You were not within 10 NM of the sub.)
17) If the sub fires a torpedo, you were close enough (10 NM) but your depth setting was off. (Remember, sub does not change depth, so don't duplicate that depth setting again!)

Program Line Comments

10-30	Title page
40-110	Instructions
120-170	Game setup/initialize variables
180	Begin new turn
190	"I GIVE UP" option
200-220	Control sub path
240	Next player's turn begins
250-310	Display ship position and input new course and speed
320-800	Determine ship position given course and speed
750-760	End of turn
840-900	Check to see if you hit reef or repair station
910-960	Display ship status
980-1010	Figure distance between attacking ship and sub
1020-1040	Sound of missile launching
1050-1100	Ask if you want to attack sub
1110-1210	Attack sequence
1220-1300	Torpedo attack
1320-1350	Assign each player a "code number"
1430-1440	Win sequence
1450-1480	Draw sub path
1520	End of game loop
1530	Designs screen

Variable Descriptions

A3 = Game difficulty level
D = Max depth for sub
DD = Actual sub depth
DR = Course in degrees
DS = Direction of sub (degrees)
KE(4) = "Code number" for each player
MD(2) = ASROC depth setting
ML(4) = Missile launchers operational (2 max)
MS(4) = Missiles left (4 max)
MR = Moves before sub changes course (7 to 9)
MV = Counts sub moves
P = Current player number
P4 = Number of players in game
PR(4) = Speed available (30 KTS max)
SD = Distance between sub and ship
SP = Speed
T = Turn
TT = Total turns (100 max)
X(4,5)
Y(4,5) = Stores ship's last 4 moves
XS(102)
YS(102) = Stores sub's entire route

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110	23	980	200
160	63	1180	11
310	230	1300	237
580	170	1420	239
850	6	END	226

The listing: SUBSERCH

```
10 R=RND(-TIMER):CLEAR100:DIMX(4
,5),Y(4,5),MS(4),ML(4),PR(4),XS(
102),YS(102):CL$=CHR$(128)+CHR$(
128)+CHR$(128)
20 CLS(0):PRINT@74," 'SUB SEARCH
' ";:PRINT@112,"BY";:PRINT@138,"
 STEVE SWARD ";:PLAY"T1P1":PRINT
@76,CL$;
30 FORW=1TO20:R=RND(500):PRINT@R
,"sub";:PLAY"T170V15O1;A;A#;A-;O
5;A;A#;A-;T2P6":PRINT@R,CL$;:NEX
T
40 CLS(3):PRINT"MISSION: DESTROY
 ENEMY SUBMARINE";:PRINT@40,"*SP
EED: 10KTS   ";:PRINT@72,"*DEPTH:
 UNKNOWN";
50 PRINT@128,"FORCE:1 SPRUANCE C
LASS DESTROYER";:PRINT"*EQUIP  :
 SONAR (DISTANCE ONLY)":PRINT"*S
PEED  : 0 TO 30 KTS":PRINT"*HEAD
ING: 001 TO 360 DEGREES"
60 PRINT"*WEAPONS: 4 ASROCS":PRI
NT@296,"*RANGE: 10NM":PRINT@328,
"*DEPTH SETTING: MUST BE":PRINT@
360," WITHIN 25 FT OF SUB"
70 PRINT@480,"...HIT <ENTER>";:L
INEINPUTA$
100 CLS(4):PRINT"SUB STARTS IN C
ENTER...COURSE   CHANGES EVERY 7
-9 TURNS.":PRINT:PRINT"EACH PLAY
ER STARTS IN A CORNER.":PRINT:PR
INT"TO REPAIR AND REARM SHIP, HE
AD  FOR RED REPAIR DOCK IN CENTE
R.";
110 PRINT@256,"TO ENTER SHIP'S C
OURSE AND SPEED...HIT <ENTER>.
 NEW SHIP TRACK";:PRINT"WILL THE
N  >>FLICKER<<":PRINT:PRINT"YOU
THEN HAVE THE OPTION OF    ATTA
CKING... HIT <Y> OR <N>";:PRINT@
480,"...HIT <ENTER>";:LINEINPUTN
$
120 CLS(3):PRINT@64," INPUT NUMB
ER OF PLAYERS";:INPUTP4:GOSUB810
:IFP4>2THENMR=7ELSEMR=RND(3)+7
130 PRINT@160," SELECT DIFFICULT
Y...":PRINT:PRINT"1. LANDLUBBER-
DISPLAYS SUB PATH 2. OLD SALT":I
NPUTA3:GOSUB1320
140 FORP=1TOP4:PR(P)=30:MS(P)=4:
ML(P)=2:NEXTP
150 PMODE3,1:PCLS(6):COLOR8,6:TT
=1:T=1:D=P4*300:DD=RND(D):GOSUB1
530
160 CLS(0):PRINT@64,"SUB DEPTH I
S 1 TO"D"FEET";:PLAY"T1P1P1"
170 DS=RND(36)*10:GOTO200
180 FORB=1TOP4:FORC=1TO4:X(B,C)=
X(B,C+1):Y(B,C)=Y(B,C+1):NEXTC,B
190 CLS(0):IFTT=101THEN1490ELSEP
RINT@64," YOU ARE ON TURN #"TT".
.GIVE UP??";:PRINT@416,"TO CONTI
NUE GAME, HIT <ENTER>":PRINT@96,
"":LINEINPUT" ENTER <I GIVE UP>.
..";G$:IFG$="I GIVE UP"THEN1490
200 MV=MV+1:IFMV=MR THENMV=0:GOT
O170
210 T=T+1:TH=T:T=2:X(0,1)=XS(TH-
1):Y(0,1)=YS(TH-1):DR=DS:SP=10:P
=0:GOTO320
220 XS(T)=X(0,2):YS(T)=Y(0,2):IF
A3=1THEN1450
230 P=1
240 GOSUB910:SCREEN1,1
250 FORN=1TO3:LINE(X(P,N),Y(P,N)
)-(X(P,N+1),Y(P,N+1)),PSET:NEXTN
260 FORN=1TO100:A$=INKEY$:IFA$<>
""THEN280ELSENEXTN
270 FORN=1TO3:LINE(X(P,N),Y(P,N)
)-(X(P,N+1),Y(P,N+1)),PRESET:NEX
TN:GOTO250
280 LINE(X(P,1),Y(P,1))-(X(P,2),
Y(P,2)),PRESET:CLS(4):PRINT@64,"
SKIPPER..WHAT COURSE (001-360)";
:INPUTDR:IFDR>360ORDR=0THEN280
290 PRINT@160,".";:INPUT"..WHAT
SPEED";SP
300 IFSP>PR(P)THENPRINT@228,"HEY
! WE CAN'T GO THAT FAST !":PRINT
:PRINT"TOP SPEED IS"PR(P)"KTS":G
OTO290
310 TH=T:T=5:SCREEN1,1
320 'DIRECTIONS
330 IF DR=360THEN340ELSE370
340 X(P,T)=X(P,(T-1))
350 Y(P,T)=Y(P,(T-1))-SP
360 GOTO710
370 IF DR<>090THEN410
380 X(P,T)=X(P,(T-1))+SP
390 Y(P,T)=Y(P,(T-1))
400 GOTO710
410 IF DR<>180THEN450
420 X(P,T)=X(P,(T-1))
430 Y(P,T)=Y(P,(T-1))+SP
440 GOTO710
450 IF DR<>270THEN490
460 X(P,T)=X(P,(T-1))-SP
470 Y(P,T)=Y(P,(T-1))
480 GOTO710
490 IF DR>90THEN550
500 AA=90-DR:AB=DR
510 GOSUB770
520 X(P,T)=X(P,(T-1))+INT(SB)
```

```
530 Y(P,T)=Y(P,(T-1))-INT(SA)
540 GOTO710
550 IF DR>180THEN610
560 AA=DR-90:AB=90-AA
570 GOSUB770
580 X(P,T)=X(P,(T-1))+INT(SB)
590 Y(P,T)=Y(P,(T-1))+INT(SA)
600 GOTO710
610 IF DR>270THEN670
620 AA=DR-180:AB=90-AA
630 GOSUB770
640 X(P,T)=X(P,(T-1))-SA
650 Y(P,T)=Y(P,(T-1))+SB
660 GOTO710
670 AA=DR-270:AB=90-AA
680 GOSUB770
690 X(P,T)=X(P,(T-1))-SB
700 Y(P,T)=Y(P,(T-1))-SA
710 GOSUB840
720 T=TH:IFP=0THEN220
730 GOSUB980:GOTO1050
740 GOSUB1360
750 P=P+1:IFP<=P4 THEN240
760 TT=TT+1:GOTO180
770 R5=57.29577951:AC=90
780 AA=AA/R5:AB=AB/R5:AC=AC/R5
790 SA=(SIN(AA)/SIN(AC))*SP
800 SB=(SIN(AB)/SIN(AC))*SP:RETU
RN
810 DATA 0,0,5,5,255,0,250,5,255
,191,250,186,0,191,5,186
820 FORP=1TOP4:READX,Y,X1,Y1:FOR
N=1TO4:IFN=3THENX(P,N)=X1:Y(P,N)
=Y1 ELSEX(P,N)=X:Y(P,N)=Y
830 NEXTN,P:XS(1)=128:YS(1)=96:R
ETURN
840 IFX(P,T)<0ORX(P,T)>255ORY(P,
T)<0ORY(P,T)>191THEN880
850 IFP=0THEN RETURN
860 IFX(P,T)<118ORX(P,T)>138ORY(
P,T)<86ORY(P,T)>106THENRETURN
870 CLS(2):PRINT@64,"YOU HAVE RE
ACHED THE REPAIR DOCK":PR(P)=30:
MS(P)=4:ML(P)=2:PLAY"T1P1P2":GOS
UB980:T=TH:GOTO750
880 IFP=0THENT=TH-1:MV=0:GOTO170
890 CLS(8):PRINT@96,"SKIPPER!  W
E HIT THE REEF !!!":PR(P)=PR(P)-
10:PLAY"T2P1":IFPR(P)<20THENPR(P
)=15
900 PRINT:PRINT"WE HAVE PROP DAM
AGE !":PRINT:PLAY"P1":PRINT"TOP
SPEED IS NOW"PR(P)"KTS.":PRINT:P
RINT"TRY AGAIN...":GOSUB1420:T=T
H:GOTO240
910 CLS(3)
920 PRINT@32," STATUS OF DESTROY
ER #"P
```

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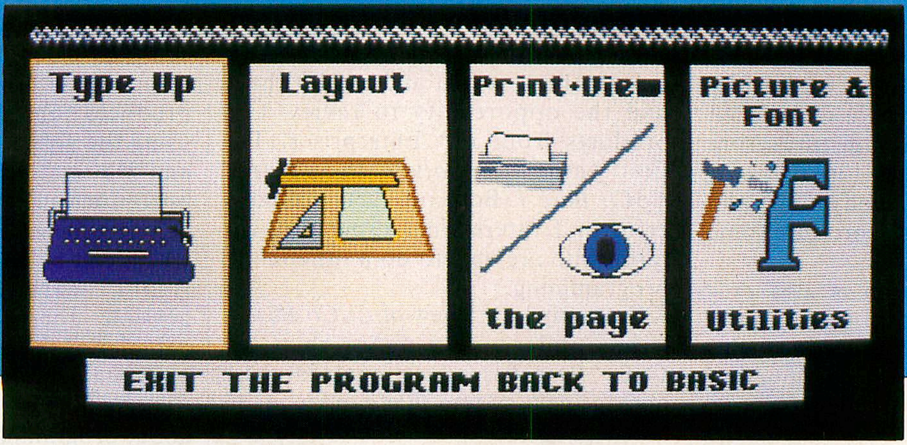
NEW FREE CATALOG

```
930 PRINT@128," TOP SPEED ="PR(P
)"KTS"
940 PRINT:PRINT" ASROCS ="MS(P)
950 PRINT:PRINT" LAUNCHERS ="ML(
P)
960 PRINT@480,"...HIT <ENTER>";:
LINEINPUTF$:RETURN
980 SX=ABS(XS(T)-X(P,5))
990 SY=ABS(YS(T)-Y(P,5))
1000 SD=INT(SQR(SX*SX+SY*SY))
1010 RETURN
1020 FOR H=1TO MS
1030 PLAY"T15V10O3CC#DD#EFF#GG#A
A#B;P1T40O1V31ECBP2ECBP2ECBP2ECB
P2ECBP2ECBP1P1P1"
1040 NEXT H:RETURN
1050 A$=INKEY$
1060 LINE(X(P,5),Y(P,5))-(X(P,4)
,Y(P,4)),PRESET
1070 PLAY"L20O4V5T15CE"
1080 LINE(X(P,5),Y(P,5))-(X(P,4)
,Y(P,4)),PSET
1090 IFA$="Y"THEN1110
1100 IFA$="N"THEN740ELSE1050
1110 FOR W=1TO5
1120 FOR WT=0TO8:CLS(WT):PRINT@1
60,"^ ^ ^ ^ BATTLE STATIONS ^ ^
^ ^ "
1130 PLAY"T170V31O1;A;A#;A-;O5;A
;A#;A-P2":NEXTWT,W
1140 IFMS(P)=0ORML(P)=0THENPRINT
@64," HEY SKIPPER...HOW ABOUT HE
ADING FOR THE REPAIR DOCK ? ? ?"
:PLAY"T1P1P1":GOTO740
1150 PRINT@64," HOW MANY ROCKETS
";:INPUTMS:IFMS<1THEN1150
1160 IFMS>MS(P)ORMS>ML(P)THENPRI
NT@256," SKIPPER...WE CAN'T DO T
HAT ! !":PLAY"P1P1":GOTO1140
1170 MS(P)=MS(P)-MS:FORWT=1TOMS
1180 PRINT@(128*WT+128),"WHAT DE
PTH FOR ROCKET #"WT;:INPUT MD(WT
)
1190 NEXTWT:SCREEN1,1:GOSUB1020:
PLAY"T1P1P1"
1200 IF SD>10THENPLAY"P1":GOTO74
0
1210 FORWT=1TO MS:IFABS(MD(WT)-D
D)<26THEN1430ELSENEXTWT
1220 PLAY"L4V1O4T1"
1230 FORE=1TO30:FORF=1TO7:PLAY"C
P4T+":NEXTF:PLAY"V+":NEXTE
1240 PLAY"T38P1V31O1ECDP20ECDP20
ECDP20ECDP20ECD"
1250 CLS(8):ONRND(2)GOTO1260,129
0
1260 PRINT@96," SKIPPER! WE TOOK
 A HIT IN THE   ENGINE ROOM !":P
RINT:PLAY"T1P1"
1270 IFPR(P)<21THENPR(P)=25
1280 PR(P)=PR(P)-10:PRINT@192,"
TOP SPEED IS NOW"PR(P)"KTS.":GOS
UB1420:GOTO740
1290 PRINT@96," SKIPPER!!  WE TO
OK A HIT AFT!!":PLAY"T1P1"
1300 ML(P)=ML(P)-1:PRINT@160," W
E LOST A ROCKET LAUNCHER !!!":PL
AY"P1":PRINT@320," LAUNCHERS NOW
 OPERATIONAL="ML(P):GOSUB1420:GO
TO740
1320 CLS(0):PRINT@96,"GET READY
TO COPY DISTANCE CODE.":PRINT"DO
N'T LET ANYONE SEE YOUR CODE!!";
:PLAY"T1P1P1"
1330 FORN=1TOP4:CLS(0)
1340 PRINT@64," PLAYER #"N"YOUR
NUMBER IS.....":KE(N)=RND(10):PR
INT:LINEINPUT"...READY?...HIT <E
NTER>";W$
1350 PRINT@192,"......."KE(N):P
LAY"T5P1L50O5C10":NEXTN:RETURN
1360 CLS(2):PRINT" SKIPPER #"P".
..USE YOUR CODE #  TO DETERMINE
SUB'S DISTANCE.":PRINT:FORWT=1TO
10
1370 IFWT=KE(P)THENPRINTWT". "SD
:GOTO1390
1380 RN=RND(2):ONRND(2)GOSUB1400
,1410
1390 NEXTWT:PRINT@480,"...HIT <E
NTER>";:LINEINPUTF$:RETURN
1400 PRINTWT". "(ABS(SD+RND(RN*1
5))):RETURN
1410 PRINTWT". "(ABS(SD-RND(RN*1
5))):RETURN
1420 FORWT=1TO4000:NEXTWT:RETURN
1430 FORC=1TO250:PLAY"T40O5C":CI
RCLE(XS(T),YS(T)),C,8:NEXTC:PLAY
"T1P1"
1440 CLS(8):PRINT@37,"---MISSION
 COMPLETE---";:PRINT@99,"SUB DES
TROYED AT"DD"FEET.";:PLAY"P1P1":
GOTO1500
1450 DRAW"BM128,96"
1460 FORD=2TO(TT+1)
1470 LINE-(XS(D),YS(D)),PSET
1480 IFCN=1THEN1510ELSENEXTD:GOT
O230
1490 TT=TT-1:CLS(8):PRINT@64,"BE
TTER LUCK NEXT TIME..........":
PLAY"T1P1":PRINT"SUB WAS AT"DD"F
EET.":PLAY"P1P1"
1500 CN=1:PCLS(6):SCREEN1,1:GOSU
B1530:GOTO1450
1510 FORWY=1TO2:PLAY"T170V31O1;A
;A#;A-;O5;A;A#;A-":NEXTWY:PLAY"T
2P1P3":NEXTD
1520 GOTO1520
1530 CIRCLE(128,96),10,7,.95:PAI
NT(128,96),7,7:LINE(0,0)-(255,19
1),PSET,B:LINE(1,1)-(254,190),PS
ET,B:RETURN
```



CoCo Newsroom — Desktop Publishing for the CoCo 3

CoCo Newsroom is a full-featured desktop publishing package for the CoCo 3. The program is supplied on three disks and comes with 16 pages of typewritten instructions. The disks are not copy-protected, and making backups for your own protection is encouraged.

CoCo Newsroom provides the CoCo 3 user with a valuable tool previously reserved for the more expensive PC machines. This program is very easy-to-use, and excellent step-by-step menu selections help you turn out an impressive small newspaper. All you have to do is select one of four options at the main menu: Type Up, Layout, Print-View the page, and Picture and Font utilities.

To construct your publication, select Type Up first to compose the various articles or subject matter. Then use Layout to arrange the articles in blocks that fit on the page in two-column format. Next, add appropriate pictures from the picture disk, and select the various fonts from the font disk to complete your publication.

In the Type Up mode, the screen displays a large work area with icons, or pictures, representing the various commands available. The arrow keys control the cursor, and selection is made with the space bar.

The commands available in Type Up are: PICTURE STAMP, for stamping a picture loaded from memory onto the work sheet; TRASH, for throwing away the screen if you are not satisfied or want to start over; UNDO, for undoing mistakes; and PENCIL, a submenu that allows you to select Line, Box, Circle, Fill, Erase, Text, Dot or Invert.

Actual composition is done in the Text mode. Other options are available to enhance the overall appearance and layout of the article or story: GRAB PICTURE allows you to grab a picture from the screen and store it in memory for later recall using the stamp picture icon; DISK MENU provides a submenu for use with the other two disks; and LOAD A FONT SET loads a font (type) set from the font disk. There are over 20

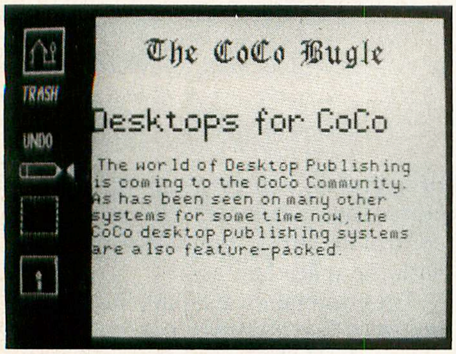
CoCo Newsroom fonts to choose from, or you can use *Color Max 3* fonts.

To load a fill pattern set as generated by the fill pattern editor, select `LOAD FILL PATTERN SET`. Three fill patterns are available on the font disk. These are handy graphics patterns of lines, dots, crosshatches, diamonds, etc. Once selected, type the drive number to load the fill set from, then select the filename.

`LOAD/SAVE A GRAPHIC PANEL` loads or saves a complete article or graphics panel from disk for later editing or printout; `LOAD/SAVE NEWS ART` selects the picture of your choice from the assortment of 50 on the picture disk or from one of your own creations. You won't see the pictures until you stamp them onto the worksheet. This is the same for the font disk and is a minor inconvenience, since you are shown a word list of available fonts and pictures.

The package also comes with a Picture Grabber program that is designed to allow the user to grab pictures from any standard `PMODE 4` picture or *Color Max* file. This is a very handy utility and can be used effectively to produce some outstanding pictures.

A Configure program is also provided that lets you set up *CoCo Newsroom* to fit your individual needs with monitor and printer type, number of disk drives, etc.



The CoCo Bugle

Desktops for CoCo

The world of Desktop Publishing
is coming to the CoCo Community.
As has been seen on many other
systems for some time now, the
CoCo desktop publishing systems
are also feature-packed.

I found *CoCo Newsroom* to be an excellent program. It was easy to use and required minimal reading of the instructions to acquire a working knowledge. I was able to create some pretty neat pages in short order.

I believe *CoCo Newsroom* will be a smash for the CoCo 3. It provides the average CoCo 3 user with some very sophisticated features and options. CoCo users with club or social responsibilities can use it to publish their own newsletters; schools and CoCo Users Groups will love it, too. They will be able to publish monthly newsletters and bulletins made with the very machine that is the object of their affection.

Eric Wolf is to be congratulated for this CoCo 3 programming achievement.

(Microcom Software, P.O. Box 214, Fairport, NY 14450, 716-223-1477; or Spectrum Projects, Inc., P.O. Box 264, Howard Beach, NY 11414: $49.95 plus $3 S/H)

— Jerry Semones

Software CoCo 1, 2 & 3

CoCo Base I — Refined and Improved

Over the past year and a half, I have had the opportunity to review two products from JTJ Enterprises. The first was *CoCo Solver*; the second, *CoCo Base I*. Both products are powerful and interesting, especially for those who are able to do a little BASIC programming.

Since my last review of *CoCo Base I*, it has undergone a major revision. *CoCo Base I* is a relational database management system that consists of 13 BASIC programs and one machine language program for data entry editing. All programs except *Util*, a directory saving utility, are accessed from the main program menu. Several of the programs perform normal database management functions. Fields are named, titled and assigned a data type and length using Create. Eight fields are included on each page of field descriptions. Several pages can be used for field assignments, allowing for a great deal of flexibility. Put is used to add data to the database. Records can be edited after entry and all records are available for viewing and editing. Records can also be edited using the Edit option from the main menu. Using Edit, you can edit one field while viewing another. Files are indexed using Index, which allows you to save named index files. This type of flexibility is evident throughout the use of *CoCo Base I*. A single structure file made with Create can be used for many database files, each of which can have many index files.

At first, it is annoying having to specify the name and extension of each structure and data file for menu options, but the effort is necessary for the extra options to work as they do.

Up to this point, *CoCo Base I* looks like a normal, but slightly awkward, database manager. However, there are other options. *CoCo Base I* allows the user to operate on data files using lines of BASIC code without having to keep track of file manipulation commands. This is a real boon to novices and experts alike. Novices need only master a few BASIC instructions to perform fancy feats of data manipulation and presentation. Experts can concentrate on manipulating data in a file without the distraction of file handling routines. This helps produce working procedures in a minimum of time with a minimum of effort.

Using *CoCo Base I* terminology, templates are created to operate on data. Each template is built and tested using the Action program. Templates can then be combined into a schedule of operation using Schedule. Schedule produces job files that are executed using the Jobs option. Since templates and jobs can be saved, many types of operations on data files can be available at one time as different jobs, each of which can be built of many templates. Again, nearly complete freedom is possible. Jobs can be as simple or as complex as the user desires. And nearly any data operation is possible with the right templates. The more you know about programming in BASIC, the more you can do with templates and jobs.

CoCo Base I claims to be a relational database management system. This generally means that data files can be linked together by a common data field, allowing multiple files to be manipulated together. In the strictest sense, *CoCo Base I* lives up to the claim. It does this in an unusual way, however. Multiple files are not accessed at once. Instead, files are accessed one at a time as a new file is built. The end result is the same as that achieved by other relational database managers, but the method is somewhat slower. The resulting file remains after the operation, though. This means that multiple operations could be used on many files to produce many new files that could be manipulated by *CoCo Base I*. The possibilities seem endless, limited only by imagination, computer memory and disk space.

Since I am comfortable programming in BASIC, I found *CoCo Base I* interesting, powerful and reasonably simple to learn. Beginners should expect to spend some time experimenting with templates to get the full power of *CoCo Base I*. This is a very powerful tool capable of performing amazing feats if it is given a chance.

I did find a few annoyances with *CoCo Base I*. The first complaint is with the screen displays. Maybe I'm too sensitive, but I found the flashing options on the main menu annoying. Also, some of the programs scroll the screen display as they display file access information. I found it disconcerting to see a screen disappearing as I was watching the status report at the bottom of the screen. Finally, I don't like programs that make noises. Luckily, the sound prompts are not necessary for proper program operation, so I could turn the volume down. None of these are really problems, just my own preferences.

I did have a couple of minor problems using *CoCo Base I* on a CoCo 3. There seems to be some problem with memory allocation. Since it wasn't written for the CoCo 3, I guess that a few minor problems are to be expected. This leads to the first part of my *CoCo Base I* wish list. I've gotten addicted to the 80-by-24 text screen available on the CoCo 3. I sure wish that a version of *CoCo Base I* were available that could take advantage of it. I also wish there were some way for the programs to trap and report errors. When there is a program error, *CoCo Base I* bombs. Instructions are given for recovery, but if Tandy had been kind enough to include error trapping commands in BASIC, *CoCo Base I* would be a smoother operator.

My last problem is with the program's manual. While it is well-written, the manual could use some improvement. I had to try everything a couple of times before I understood the printed instructions. A tutorial with lots and lots of examples would help more than anything else. Detailed, step-by-step directions for building a common application would have been warmly received and would go a long way toward making *CoCo Base I* a general-purpose tool easily understood by all levels of users.

Complaints aside, this is really an amazing package. It has a good feel about it. I am also amazed at its flexible power. I am often frustrated by programs that won't let me do some odd thing that I want to do. I never ran into a problem with *CoCo Base I* that I couldn't solve one way or another. I find it encouraging to have this much freedom when using a program. I recommend *CoCo Base I* to anyone willing to give it a chance, forgive its quirks, and enjoy its power.

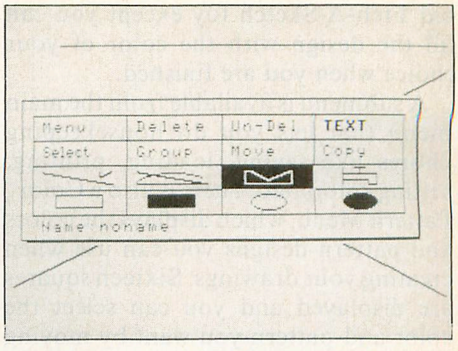
(JTJ Enterprises, P.O. Box 110841, Nashville, TN 37211, 615-793-0450; $34.95)

— Don McGarry

Software CoCo 3

Color Computer Artist — OS-9 Level II Graphics

Tandy's recent entry into the world of graphics for the CoCo 3 is *Color Computer Artist*. This unprotected software is supplied on disk and is in OS-9 Level II format. It's booted up by simply typing `DOS` on a CoCo 3 with at least 128K of RAM. After booting up, the program prompts the user for the specific kind of monitor and joystick being used (the two-button deluxe version is recommended) and asks whether or not you are using the Tandy Hi-Res Joystick Interface.



Color Computer Artist was written by Steve Bjork for Tandy and comes with a colorful 14-page instruction booklet.

After the program loads, you are presented with a plus sign (+) cursor on a blank screen. Getting to the main menu requires either pressing the second button on the deluxe joystick or ALT-3 on the keyboard.

The main menu displays, in icon style, various words and symbols representing the functions available at that level. You can delete, undelete, add text, move, copy or fill (paint) from this menu. If you choose Select, a blinking circular cursor is displayed and you can move, copy or delete any object on the drawing screen. Another option, Group, allows you to select more than one object to move, copy or delete. The program features the customary rubber band line, box, circle and polygon, but also offers something that is a little different, called Free Hand. In this mode, you control the movement of the cursor totally as it moves around on the screen. In this way, you can draw to your heart's content without having to move a cursor from one point to another point or worry about having to match up connecting lines. What you get in this mode is very much like the

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old Etch-A-Sketch toy except you can fill the design with the color of your choice when you are finished.

A submenu is available from the main menu that lets you do housekeeping chores like saving, loading, printing, setting colors, etc. There is also a Color/Pattern Menu, which displays the colors and pattern designs you can use when creating your drawings. Sixteen squares are displayed and you can select the color and pattern you want by moving the square cursor with your joystick. A similar Text/Color Menu provides a way to add text of various sizes and colors to your pictures.

While *Color Computer Artist* is a smoothly operating program, I wouldn't compare it with the heavyweights like *Color Max 3* and *CoCo Max 3*, which offer added features like fat-bits, zooming, line erase, animation and other popular commands. *Color Computer Artist* is, however, written in OS-9 Level II and is capable of providing some interesting ideas with the `windows` command in OS-9. This is a good program and will provide most CoCo users with the necessary tools to make neat drawings.

(Tandy Corporation, 1700 One Tandy Center, Fort Worth, TX 76102; $29.95. Available in Radio Shack stores nationwide.)

— David Gerald

Software CoCo 1, 2 & 3

Address — Computer Address Book

At least once a year I get fed up with all the pieces of note paper, parts of envelopes and such, falling out of my address book — all of those temporary changes that never get posted. Then it's cross-out-and-hope-there's-room-on-the-page time. Eventually the page gets filled and you have to buy a new address book.

Address, by R.J.F. Software, makes those infernal postings ridiculously simple. Not only that, but this disk-based program also prints out the envelopes for you. Its base is a set of 15 files, some of which are devoted to only one letter, others to several letters. The authors supposedly did a study of last-name beginning letters and assigned the files accordingly.

Not to worry, though. If you have a lot of friends and relatives whose last names begin with 'Z', the program allows you to stash them in another letter's files if need be.

The five-page instruction booklet is clear and helpful, although the primary menu and prompts would probably be enough.

The "search" capability is rather amazing to me: Not only can you search for records by last name, you can search by ZIP code, area code, state, city, and so on. This leads me to surmise that, even though it is primarily designed to hold up to 270 different name/address sets, you can set up your own database that depends partially on sorting by letters: business accounts, small household inventories, etc.

You can set the program to print anything from $^{15}/_{16}$-inch mailing labels to 9½-inch envelopes. The only catch is you have to store your own name and address in the file to answer the Return Address prompt.

As mentioned, the prompts for each of eight possible functions (e.g., Add a file, Change a file, Search, Delete, Print, etc.) are easy to follow. It took me about 10 minutes to start transposing our paper-cluttered address book into the disk as I tested its capabilities. You can store two separate telephone numbers, enter the country (if applicable), and make a tricky job easy. Record review can be done on the full-sized screen, sent to the printer, or both.

The only minor omission, in my opinion, is an option to set printer baud rates. You can, of course, do that with a poke before loading, but my recommendation to R.J.F. is to add that as a future enhancement.

All in all, I found *Address* to be an excellent program which, with a little imagination, could be used to establish a small database for any number of categories.

(R.J.F. Software, R.R. 2, White Lake, Ontario, Canada K0A 3L0, (613) 623-7824; $14.95 plus $3 S/H)

— John M. Hebert

Software CoCo 1, 2 & 3

Autoterm 6.1 — Vast CoCo 3 Improvements

Today, the CoCo community is faced with a bewildering array of terminal programs. This is largely a function of the simple fact that there is no perfect terminal package — one which will meet every need or suit every personality. The choice of a terminal package is simply a matter of preference. Polish and sophistication are totally unrelated to basic functionality. Fine attention to detail and the development of a truly user-friendly interface require an immense investment in time and effort. The product must spend time in public view, allowing for substantial feedback to develop, for wish lists to be submitted to the author, and for the author to respond to these inputs. *Autoterm 6.1* is a striking example of just how productive this type of development can be.

Autoterm 6.1 is, in many respects, a totally new product and is still supplied as a collection of programs. Versions are included to support the CoCo 1 and 2 in either 32 or 64K configurations. New to Ver. 6.1 are programs to fully support either a 128 or 512K CoCo 3.

The heart of *Autoterm* is formed by the interaction of three basic functions: intelligent terminal operation, text processing and the use of keyboard macros. By interweaving these capabilities, the author has largely succeeded in his attempt to build an automated terminal that blends extraordinary power into a truly user-friendly interface.

As an intelligent terminal, *Autoterm* supports standard buffer capture via Xon/Xoff (DC1/DC3), as well as Xmodem, an error checking protocol that allows for the error-free transmission and reception of data, an absolute must where binary program downloads are involved. While *Autoterm* downloads may not be written directly to disk, all other disk I/O operations are smoothly implemented. Directories may be read, and files saved, loaded, transmitted or erased while online. *Autoterm* suspends the reception of incoming data during disk access, so disk operations must be timed for execution when data is not being received. Information that has been captured may be scanned, saved, edited, or printed while online, with the capture buffer still receiving new information.

A display at the top of the terminal

screen indicates the available memory, whether the buffer is in the capture or scan (open or closed) mode, and whether lowercase has been toggled on or off. A total of 27 individual parameters such as communications baud rate, parity, screen width, and printer configuration commands (page length, etc.) are user-definable via a terminal status screen. As is the case with most CoCo 3 terminal packages, communications at 2400 baud is smoothly implemented through the serial (bit-banger) port. The addition of a Radio Shack RS-232 pack, while not required, provides the additional flexibility of printing the buffer contents while online.

As receiving or transmitting data is only a part of the process involved in information exchange, immediate access to a text processor can become habit-forming. Without loading another program, new or received text may be viewed, edited, searched, and printed, all from within *Autoterm*. While the text processor does not possess the broad capabilities of a dedicated word processor, it is quite powerful in its own right. Word wrap, block operations, search and find commands, and printer control are all fully implemented. As the text processor and the terminal share the same buffer, the user is greeted with a screen that is identical to the one in the terminal mode. This "seamless" transition has a very comfortable feel about it, and adds to the overall ease of use, especially for those new to the telecommunications environment.

As most online time accrues some sort of cost, either in long distance charges, connect charges, or both, the ability to fully automate a computer to computer dialogue can result in substantial savings. *Autoterm* uses a "language" which allows the user to build keystroke multipliers (KSMs) that can recognize and respond to the prompts of a host system. While there are many names for this sort of dialogue capability, the KSM scheme in *Autoterm* provides for every conceivable keystroke sequence, and in that sense may be the most powerful automated dialogue language (often called "autolog") currently available for the CoCo. The author uses "wedge notation" to designate multiple key-press operations, i.e., <SCL> represents a shift/clear sequence, while <DAR> stands for down/arrow. The full integration of virtually all system commands into the KSM scheme allows the user to program conditional operations into an automated scheme, allowing for the total automation of many computer dialogue sessions. Indeed, *Autoterm* may be programmed to log on at a given time (a clock program is included), dial an information service, read (and save) your waiting mail, and then log off — all faster than you could type the necessary commands to a host system. The result is less "connect time" on pay services and, thus, lower cost.

With the release of Version 5.0, support of the RS-232 pack, Radio Shack Direct Connect Modem Pak, and the J&M parallel printer port were added. Also, printer baud rate was implemented as a user-definable parameter and printing while online was enabled. The core program was also modified to automatically load a KSM file as part of the start-up procedure, effectively allowing for automatic self-configuration of the program. Version 6.1 has added a split-screen "chat" or packet radio mode. This feature allows the user to view (and edit) several lines of text prior to transmitting them to a host system, while still viewing the "live action" on the upper part of a split screen, vastly improving user control (and comfort) during "real time" online conferences.

The features mentioned to this point are common to *all* the programs released on Version 6.1, but *Autoterm* has been vastly improved for the CoCo 3.

For all its apparent power, previous versions of *Autoterm* failed to support any form of 80-column display. With the advent of the CoCo 3, *Autoterm* has come of age. The 80-column display of the CoCo 3 is a true joy to view on a Magnavox 8CM515 monitor. The author has added a downright sensuous scroll routine to the CoCo 3 screen, and complemented this with full paging ability — both of which may be accelerated to almost any rate. These enhancements are topped off with a "jump" command that instantly relocates your position within the capture buffer. Screen colors are controlled by the contents of four palette registers, and are configured via BASIC.

The available buffer is approximately 90K for a standard CoCo 3, and 475K for machines with a 512K upgrade. *Autoterm* takes advantage of the entire RAM, overwriting BASIC, creating a buffer that *appears* continuous to the user. Because of this structure, the return to BASIC may be faulty when the user exits *Autoterm*. To ensure proper operation, a cold reboot must be performed after using *Autoterm* in the CoCo 3 mode. While the error-trapping within *Autoterm* is superb, the ability to return the CoCo 3 versions to BASIC via a software command creates the potential for the faulty operation of subsequent programs. But disabling of the software Exit command (shift/break) from the main menu, creating an absolute requirement for a cold reboot, would certainly remove any potential for error.

***
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During the time in which this review was prepared, talk of a 512K bug in *Autoterm* began to appear on the Delphi CoCo SIG.

As *Autoterm 6.1* ran perfectly with all Radio Shack 512K installations, suspicion was directed to the construction of the third party boards and the installation procedure for those boards. As the 512K board is straightforward in its design, it seemed that the installation procedure might be the culprit. Indeed, when Phil Zwart (*Autoterm* author) called the folks at the Fort Worth Service Center, he was informed that *Tandy varies its 512K installation procedure* depending on the revision level of the CoCo 3 motherboard. It appears that the "crashes" reported on Delphi may well be a function of some previously undocumented variability in the construction of the CoCo 3.

Within a week, Phil Zwart had identified this "bug" and modified *Autoterm* to accommodate these production differences. For the record, the third party 512K boards appear to be sensitive to how the screen address can be positioned in memory on *some* CoCo 3s. Technically, the fix involved changing any screen address at an eight-byte boundary to a 64-byte boundary. New disks containing the fix (Ver. 6.2), were prepared and shipped to his 512K users within a week, demonstrating PXE Computing's dedication to customers in providing a level of support and concern seldom seen.

The documentation for *Autoterm* is supplied as a bound manual, consisting of 85 thorough and well-written pages. Sample KSMs and automated computer dialogues are provided, all with excellent annotation. As the program is copy-protected, two complete diskettes are furnished to guard against media failure. As some version of *Autoterm* will run on virtually every CoCo system with at least 32K, there are no practical minimum system requirements. However, the use of a CoCo 3 and at least one disk drive are necessary for the enhanced A128 and A512 revisions. An 80-column RGB or monochrome monitor and an RS-232 pack are also very desirable complements to this terminal package.

Perhaps PXE's Phil Zwart will continue his tradition of support by considering part of this wish list for his next revision: a character trap/filter, the ability to download directly to disk, and, perhaps, support for Ymodem, Kermit, and CompuServe B transfer protocols. But, *Autoterm 6.1* certainly represents one of the very best values in CoCo software.

(PXE Computing, 11 Vicksburg Lane, Richardson, TX, 75080, 214-699-7273; disk, $39.95; tape, $29.95 plus $3 S/H)

— Henry Holzgrefe

Hardware

CoCo 1, 2 & 3

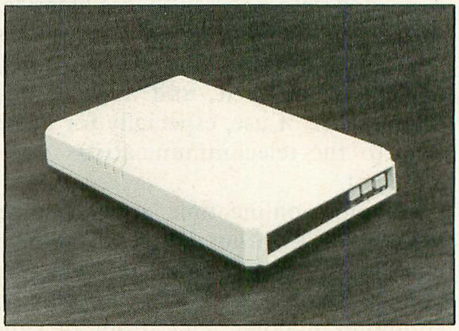
Avatex 2400 Modem — Inexpensive Hayes-Compatibility

The Avatex 2400 modem has recently been introduced as a high speed, bargain-priced modem offering full Hayes compatibility. While the current thinking seems to indicate that all modems offering full Hayes compatibility will function in an equivalent fashion, such is not the case. An old caveat, "You get what you pay for," still applies.

Compared to several other low-end 2400 baud modems, the Avatex 2400 acquits itself quite well. It does, in fact, support the entire, extended Hayes command set. The modem is housed in a beige plastic case and comes with an external power supply and a null modem cable (supplied by the vendor) to facilitate connection to the serial port of the CoCo. The front panel contains a bank of eight LEDs, which report line status, terminal operation and call progress. Three push/push switches toggle the data/voice, originate/answer, and synchronous/asynchronous modes. A power switch, RS-232C port (female, D-type, 25-pin), and two modular phone jacks (female, RJ11-C) are located on the rear panel. The dual phone jacks allow for the simultaneous connection of the modem and telephone with immediate user access to either one. Gone, however, are the DIP switches present on some earlier Avatex modems.

The documentation is extremely well-done. Indeed, the 98-page manual is a virtual short course in telecommunications via the Hayes command set. And, the entire package has a two-year warranty. Given all of these adequate to occasionally excellent characteristics, why did I open this review with a cautionary statement?

The gold standard by which all modems are compared is their ability to resist line noise, expressed as a signal-to-noise ratio (in decibels). Unlike most electronic devices, where high S/N ratios are deemed "good," the modem that can operate with the least separation between signal and noise wins the race. In the world of telecommunications, two types of noise prevail: garden variety white line noise, and perturbations due to phase shift when the signal makes a transition from one medium, such as wire, to another, such as a fiber optic cable. Phase shift, in particular, affects 2400 baud transmission due to the protocol used for high speed operations (CCITT V.22bis). In a side-by-side comparison, the Avatex 2400 was outperformed by its more expensive competition. In particular, at 2400 baud, the Avatex 2400 dropped characters, inserted "garbage," or (worst case) failed to connect, while a more expensive 2400 baud modem continued to function smoothly. These observations, while subjective, highlight the problems of line noise and intrinsic differences in the modems' construction. Hayes-compatible does not mean Hayes-equivalent. But neither does it mean that you should buy the most expensive modem you can find.



I called the folks at Elec & Eltek (USA) Corporation (importers of the Avatex modems) and asked their technical representative for any benchmark signal-to-noise values that he might have, or be willing to share, pertaining to the Avatex 2400. While these values were not available, the representative remarked that the Avatex 2400 was "about average." He did, however, confirm a suspicion that many people have mentioned: a 2400 baud modem operating at 1200 baud will outperform a 1200 baud modem of similar manufacture. Indeed, at 1200 baud, the Avatex 2400 ran circles around my Avatex 1200. When queried as to why this might be, the representative replied that the chip set necessary to support the 2400 baud protocol was necessarily of higher quality than that found in a dedicated 1200 baud machine.

The implications of this situation are very important. The best buy for routine 1200 baud communication may well be an inexpensive 2400 baud modem, operating at 1200 baud. For those who demand excellence in 2400 baud performance, modem quality and line noise become primary considerations. For local links over quiet lines, the Avatex 2400 is indistinguishable from a Hayes 2400. If, however, you live at "trails end," and your telephone service is one step above a string and tin can, the Avatex 2400 operating at 1200 baud may be the best value.

(Cinsoft, 2235 Losantiville, Cincinnati, OH 45237, 513-396-7638; $239)

— Henry Holzgrefe

Software CoCo 3

Printer Lightning — Easy, Reliable Print Spooler

Printer Lightning is a memory-resident print spooler for the CoCo 3. The program stores information going to your printer, then prints it out in the background while you go on using your CoCo 3 for work (or play!). Owl-Ware is the distributor of this handy little utility from ColorVenture, the creators of *Pyramix*.

The program is loaded into memory and executed. The disk can then be removed from the drive. *Printer Lightning* then prompts the user for several pieces of information. First, a Hi-Res memory option for a bigger buffer is offered. Pressing 'Y' (yes) gives you more storage space but prevents use of the graphics screens. Baud rate is then optionally selected, a query is made as to whether your printer requires line feeds after carriage returns, and the program is ready to use.

Once installed in memory, the program remains active until the machine is turned off or reset. There are a few programs that conflict with memory used by *Printer Lightning*, but they are the exception rather than the rule.

Use of the program is automatic, in that anything that would normally be handled by the standard print vector (`PRINT#-2` command, `LLIST` command, or machine language equivalents) is automatically sent to *Printer Lightning*.

I tried *Printer Lightning* with a number of programs, including *Telewriter*, and found it very practical. It also works perfectly well with `LLIST` from BASIC, allowing you to continue working on a program while the long code is printed out. The buffer space is determined by the amount of memory your CoCo 3 has and the elections you have taken at program installation. A CoCo 3 with 128K gives you a 44K buffer, while 512K machines can have up to 437K available for print spooling.

Utility programs that work effortlessly and correctly, and that also add to the usefulness of your CoCo 3, are always nice to have. *Printer Lightning* certainly meets those criteria and must be considered a real software bargain. ColorVenture has a winner in this one!

(Owl-Ware, P.O. Box 116-D, Mertztown, PA 19539, 800-245-6228; $19.95)

— Leonard Hyre

Software CoCo 1, 2 & 3 OS-9

T/S Spell — A Dictionary and More

I recently remarked to some fellow computer users that if I had a dollar for every sort of spell checker around, I would be a rich man. There must be literally hundreds of spell checking programs for all the many types of computers in existence. But with the release of *T/S Spell* for the Tandy Color Computer line, I am firmly convinced CoCo users now have the best.

Now that may seem to be a pretty tall boast, so let me lay out the evidence.

In an overview of *T/S Spell*, Tandy seems to have taken the best features from all the various spell checkers around and put them into one program.

In publishing *T/S Spell*, Tandy has done two things. First, they have fulfilled their implied promise in providing a menu selection of the existence of a spell checker; and secondly, they have upheld their commitment to continue to present high-quality software for the Color Computer 3, while still supporting the CoCo 1 and 2. *T/S Spell* contains versions to work on all CoCos.

When spell checking programs were first introduced, a 10,000-word dictionary was considered fantastic. When the 20-, 30- and 40-thousand word dictionaries were released, it became unbelievable that one's personal computer could be capable of checking that many words for spelling. Well, hold on to your hats. *T/S Spell* has a master dictionary of over 100,000 words!

In confirming this with the guys in the Tandy Towers here in Fort Worth, I was

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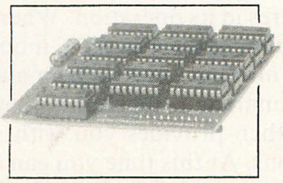

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told that these are real words, too, not *just root words.* Furthermore, *T/S Spell* uses the most advanced compression techniques around to place all of this on a 35-track floppy disk.

Not only is there a 100,000+ word Master Dictionary on the disk, there is also a 6,271-byte Quick Dictionary file on the same disk which contains the most common misspelled words. And that's not all, folks — there is still room for a user-created Personal Dictionary on the same disk. Here you can store words that do not appear in the Master Dictionary. The size of the Personal Dictionary is limited only by the amount of storage space. What this means to the user is that with the 100,000+ word Master Dictionary and the unlimited Personal Dictionary, dictionary size is no longer limited by number of words, but simply by storage capabilities. The instruction manual tells the user how to put all of this on a hard disk. Think about that for dictionary size!

T/S Spell comes on a "flippy" disk, with one side containing the programs and a minimal OS-9 Level I Version 2.0 operating system, and the other an OS-9 data disk with the dictionary files on it. It is presented on an OS-9 Level I disk so that CoCo 1 and 2 users can use it, but it does contain a version that can be used under Level II with windows.

The two versions in the `CMDS` directory are `TSSPELL`, for use under Level I and with *T/S Word*, and `TSSPELLW`, for use under Level II with windows.

T/S Word, the Tandy file format program, and its companion, *T/S Edit*, the Tandy file editor program, which together make a primitive word processor, were written to operate under OS-9 Level I, which does not support windows. And while they can both be run on the CoCo 3 under OS-9 Level II, they will still not support windows. So no matter what model CoCo or operating version of OS-9, if you want to access *T/S Spell* through the menu icons in *T/S Word*, you must use the `TSSPELL` version of the program.

I ran *T/S Spell, T/S Word* and *T/S Edit* on my CoCo 3 under OS-9 Level II. Now, there is a trick to this. It must be done on a non-graphics, non-window screen. It must be done in the 32-column screen mode available under `VDG/INIT`. In other words, the system configuration you get from OS-9 Level II — right out of the box. I merely copied all the *T/S Spell, T/S Word* and *T/S Edit* programs over to my system disk. The only drawback with using these on the CoCo 3 is that they do not and cannot take advantage of the better looking 80-column mode available under Level II. Instead, you are limited to using the awkward 80-column graphic screen that the OS-9 Level I system provides for the CoCos 1 and 2.

But there is some partial relief. As mentioned before, *T/S Spell* comes with two main programs, `TSSPELL` and `TSSPELLW`. The latter is the OS-9 Level II version (you guessed it, 'W' stands for windows). Now, while you can't use `TSSPELLW` in the *T/S Word* program, either `TSSPELL` or `TSSPELLW` can be used as a stand-alone program to spell check any ASCII file. Therefore, you can, on the CoCo 3 under OS-9 Level II, get the benefit of the better 80-column text screens by spell checking the file created with *T/S Word* outside of *T/S Word*.

The font characters are much easier to read and better looking, too.

T/S Spell has a number of unique features in its operation. When in the default `CHECK/CORRECT` mode, if it does not find your word in one of its dictionaries, it highlights that word and then provides you with several options. At this time you can choose to go one of four routes with the suspect word. You can `OK` the word and the program will proceed to the next suspect word. You can tell *T/S*

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Spell to LOOKUP a suggested list of possible replacements for the suspect word, in which case it will scan its Master Dictionary for a list of the six most similar words to your spelling, displaying them for your consideration and selection or rejection. You may choose one of the suggested words and have it substituted into your text by merely highlighting it and pressing ENTER.

You can RETYPE the suspect word. Or, you can approve the spelling of the word as it exists and ADD it to your Personal Dictionary. If you ADD the word, all further occurrences of the word will be considered valid.

After having run through all the suspect words in the text file, the program asks you if you want to save the corrections or ignore them. If you choose to save them, the program creates a new corrected text file under your original name and renames the old un-corrected text file by adding the extension .BU to it.

Next, if you did any adding, the program asks if you really want to add the new words to your Personal Dictionary. If you do and you have not already created a Personal Dictionary, the program creates one for you under the filename TSPersonal.

I'd like to pause here to say a few things about Personal Dictionaries. Notice, I said dictionaries because you can have more than one. You can create any number of special function Personal Dictionaries. The trade-off with using many Personal Dictionaries lies between all-inclusiveness versus search time, but only one Personal Dictionary may be utilized at a time in a command line.

Aside from having a Personal Dictionary created automatically with the use of the ADD function, you can also use a text editor to create one following the rules set down in the user's manual for the Quick Dictionary. If you would like TSSPELL or TSSPELLW to check your Personal Dictionary for words and it's also on Drive /D1, you must indicate its location by adding, P /D1/PERSONAL.DICTIONARY.NAME, to the command line.

Additionally, you may modify WORD.ICONS, as illustrated above, to have *T/S Spell* through *T/S Word* check your Personal Dictionary for words in your text file. However, there seems to be a little quirk in WORD.ICONS that you should be aware of when making the aforementioned modifications to include your Personal Dictionary. It seems that WORD.ICONS wants every command line to fit on one line, and if you stick with the name TSPersonal as the name of your Personal Dictionary, it is too long of a name to place on one line with all the other modifiers. What I suggest is that you adopt the same scheme of dictionary naming that *T/S Spell* uses and rename your Personal Dictionary TSP. That way the command modification for WORD.ICONS would read:

```
TSSPELL % M /D1/TSM Q /D1/TSQ P
/D1/TSP #16K.
```

T/S Spell also provides command options to change the screen colors. For TSSPELL you are limited to either a black-on-green screen (the default), or black-on-white. On the other hand, TSSPELLW provides for a number of color combinations for both its primary window and its secondary windows.

But wait! That's not the end of *T/S Spell*'s many features. We have discussed only the default CHECK/CORRECT mode. There are still two more modes of operation. If the program had stopped here with only the ability to check and correct spelling, it would still have been well worth its price, but there are two other modes: DIRECT MODE and the FILTER MODE.

Suppose you just want to look up how to spell a word as you would with any dictionary. *T/S Spell* can do that,

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too. Simply enter `TSSPELL D` or `TSSPELLW D` (if you relocated the dictionaries to Drive /D1, don't forget to tell the program in the command line, or simpler yet, just `CHD /D1`). The program then displays the message `ENTER WORD TO LOOKUP :`. Merely type in your word as you think it is spelled and the program goes to work. If the word is located in the dictionary, it displays the message `OK`. If it is not, it displays `NOT FOUND, CLOSEST MATCHES`, and then lists six words that come the closest to your spelling. You exit the `DIRECT MODE` by simply pressing `ENTER` without entering a word to lookup.

Since `TSSPELLW` works with windows, you can type out a text file in one window and, when you need to look up the spelling of a word, jump to another window and run `TSSPELLW` in the `DIRECT MODE`. Neat, huh?

The last mode is the `FILTER MODE`. The basic premise of this mode is to scan a text file and then list out all the words that do not appear in the dictionary. The list can be redirected from the normal screen output to a printer or disk file. To send the list to the printer, merely enter `TSSPELL (or TSSPELLW) F MYFILENAME >/P`.

If you don't include a filename, the program takes its input from the keyboard until an `EOF` (CTRL-BREAK) is entered as the first character on a line.

This brings another scenario to mind. Suppose you have one of those "high-tech" kids, who needs to practice his spelling words. Let him type them on the keyboard in the `FILTER MODE`. The misspelled words could then be output to the screen or listed out to the printer. Pounding a CoCo keyboard is so much more fun than the old-fashioned paper and pencil method.

I have saved one surprise about *T/S Spell* for last. With all the many features Tandy has included in *T/S Spell*, they could have charged big bucks for the program and no one would have looked twice. A plain vanilla spell checker for some of their other computers, offering about a tenth of the features that *T/S Spell* has, goes for $100 or more (and they don't have the dictionary size, either). But Tandy kept the price down, along the same lines of its other excellent programs for the CoCos. *T/S Spell* is well worth every penny and should be on everyone's must-have list.

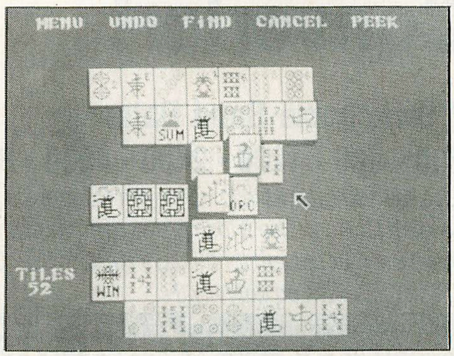
(Tandy Corporation, 1700 One Tandy Center, Fort Worth, TX 76102; $39.95. Available in Radio Shack stores nationwide.)

— Kerry M. Armstrong

Software CoCo 3

Shanghai — Fast-Paced Fun

Shanghai is based on an ancient Chinese game called Mah-Jongg. The origins of Mah-Jongg are as mysterious as the game itself, but it is believed to have started about 500 B.C. and is still played today in many parts of the world. It is similar to many card games but is played with small rectangular tiles engraved with Chinese drawings and symbols. There are 144 Shanghai tiles used on the CoCo 3 version of this ancient game. Of these, 108 are divided into suits much like playing cards. But in *Shanghai*, there are also 12 Dragon tiles, 16 Winds, four Seasons and four Flowers.



The object of *Shanghai* is to dismantle the pile of tiles shown on the screen. The pile is randomly generated for each game and is five layers deep. The dismantling process is done with the joystick by selecting matching tiles with an arrow. Tiles can only be moved in a left or right direction. Tiles between other tiles cannot be moved — only the top tiles that are free on the left or right side. If you are successful in removing all the tiles, you uncover the colorful fire-breathing dragon and win the game.

Shanghai is supplied on a ROM Pak and runs on a 128K or higher Color Computer 3. It can plug directly into the side of the CoCo 3 or, if you have a Multi-Pak Interface, just plug it into any unused slot.

The graphics on *Shanghai* are exceptional and have to be seen to be believed. The program, written by Rick Adams and designed by Brodie Lockard, is an Activision product that is simply outstanding on the CoCo 3. Since the stack of tiles is viewed from above, you can well imagine the difficulty in trying to show depth perception. The authors have taken care of this by using gray shading and black borders at strategic edges of the tiles. The result is an amazing 3-D effect that displays all five layers of the tiles with ease. As tiles are removed, the shading continues so that you still see distinct layers throughout the game.

After the game auto-starts on your computer, you are given the opportunity to select either RGB or Color Composite monitors. A main menu then appears with these options: Play Solitaire, Begin Again, Select a Dragon, Tournament Play, Challenge Match and Return to Game.

When playing, you always have the opportunity to cancel a move or to peek ahead. If you select a tile that cannot be moved, the computer beeps and displays a message that tells you the tile cannot be moved. If the tile is movable, it flashes when you tap the joystick button. After matching tiles have been selected, a final tap removes them from the screen and a countdown score is displayed in the lower-left corner of the screen. A nice touch is the use of a Chinese-style font for the text on each screen.

Tournament Shanghai can be played with multiple players and provides scores for each player. A five- or 10-minute time limit can be set and a countdown clock is displayed.

Challenge Shanghai is a no-holds-barred competition between two players, each using his own joystick. A predetermined time limit of up to 60 seconds can be selected and each successful move of two tiles nets 1 point.

I really liked *Shanghai*. It provides hours of quiet challenge or fast-paced fun if played with a friend. It is well-done, has outstanding graphics and makes your CoCo 3 really shine.

(Activision, Inc., 2350 Bayshore Frontage Road, Mountain View, CA 94043; $34.95. Available in Radio Shack stores nationwide.)

— David Gerald

Received and Certified

The following products have recently been received by THE RAINBOW, examined by our magazine staff and issued the Rainbow Seal of Certification, *your assurance that we have seen the product and have ascertained that it is what it purports to be.*

F **Cartoonamator**, a 64K disk-based animation program that displays up to one minute of animation with 20 characters and four settings that you design. For the CoCo 2 and 3. *Cocotronics Software, 29 Southbrook, Irvine, CA 92714, (714) 651-0283; $17.95 plus $2 S/H.*

CoCo Address Book, a 32K program designed to assist in maintaining a mailing list, telephone list and address file. For the CoCo 1, 2 and 3. *Bob's Software, P.O. Box 391, Cleveland, OH 44107, (216) 871-8858; $20 plus $2.50 S/H.*

Domination, a 128K board game for two to six players. The computer generates the game board (a map) and keeps track of all playing pieces. The object is to take control of the planet YCNAB by using your armies to conquer all provinces controlled by other players. For the CoCo 3. *HAWKSoft, 307 Sexauer Avenue, Elgin, IL 60123, (312) 742-3084; $18.*

SuperDisk +3, a utility that makes a spare copy of the disk directory. For the CoCo 1, 2 and 3. *Sunrise Software, 8901 NW 26 Street, Sunrise, FL 33322, (800) 628-2828; $19.95.*

Thexder, a 128K arcade game. Pilot a robot through multiple attack scenarios. The battlefields include caves, cargo holds and spaceship interiors. For the CoCo 3. *Tandy Corporation, 1700 One Tandy Center, Ft. Worth, TX 76102; $24.95. Available in Radio Shack stores nationwide.*

F **Tomb of T'ien**, a 64K animated graphics Adventure. Your village has been burned and its sacred shrine stolen by the mythical dragon. You have been chosen to conquer the dragon and retrieve the shrine so that the village may live in peace. For the CoCo 1, 2 and 3. *Valkyrie, 37 Peter Bush Drive, Monroe, NY 10950, (914) 783-0191; $19.95.*

Try-O-Tax, a program to assist with federal income tax returns. This fifth edition includes tax changes for 1987. For the CoCo 1, 2 and 3. *Try-O-Byte, 1008 Alton Circle, Florence, SC 29501, (803) 662-9500; $44.99 plus $3 S/H.*

F **Zandar**, a space game that lets you maneuver through three levels of play. The object is to leave your home planet and land safely on the farthest planet. Drone ships are between you and every planet, and it takes practice to aim your laser. For the CoCo 3. *K-Soft, 300 13th NE, East Wenatchee, WA 98801, (509) 662-9365; $24.95.*

F **First product received from this company**

The *Seal of Certification* program is open to all manufacturers of products for the Tandy Color Computer, regardless of whether they advertise in THE RAINBOW.

By awarding a *Seal*, the magazine certifies the product does *exist* — that we have examined it and have a sample copy — but this *does not* constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to THE RAINBOW reviewers for evaluation.

— Judi Hutchinson

Reach Out and Touch Someone

By Cray Augsburg
Rainbow Technical Editor

It has been some time since we have discussed the "simple" things that can be done on our CoCo SIG. Those of us who have used the system for a while have no problem performing tasks such as sending mail or posting a Forum message, and we take these things in stride and go about them without even thinking.

The new user, however, doesn't have the experience necessary to use Delphi's features "without thinking." Even discounting all the fancy things that can be done in Mail, it can be very frustrating to send that first electronic letter. And when you don't know how to do that, it becomes difficult to ask for online assistance.

Sending Your First Letter

After becoming familiar with the CoCo SIG, you might decide it is time to reach out and interact with other users. A useful way to do this is with electronic mail. You can send "letters" to other people on the system. But how do you do this?

At the CoCo SIG prompt, you can enter the Mail section of Delphi by typing `MAIL` (or `MA`, for short) and pressing ENTER. After a short wait, the `MAIL>` prompt will appear on your screen. At this point, you can do many things. The easiest, of course, is sending a simple letter.

To begin your letter, first enter `SEND`. Delphi will prompt you with `TO:`, asking for the username of the person to whom you are sending your letter. Simply enter the appropriate username. If you want your letter to go to more than one person, type in the usernames of all the people you want to write to, separating each with a comma. When you are finished entering the usernames, press ENTER. (Delphi takes care of the hard part for you.)

At this point, Delphi will respond with `SUBJECT:`. You are given the opportunity to enter a brief description of the contents of the letter (this tag helps mail recipients when the time comes to file letters away in their Mail files). Just enter your description (up to about 40 or 50 characters) and press ENTER.

Now, Delphi will tell you to enter your letter. It also tells you that to finalize ("transmit") your letter you must press CONTROL-Z. You can abort the letter at any point by pressing CONTROL-C.

The system has one quirk that can be very maddening at times. If you put enough text on one line so that the computer must go down to the next line, the system inserts a blank line between the two lines. Or it might put a few words on each of many different lines and shift these words increasingly farther to the right.

The moral of this story is simple: As you enter your text in a letter (or anywhere on the SIG, for that matter) and get near the right-hand side of the screen, go ahead and press ENTER to send that line. If you don't have room for the next word on the same line, press ENTER and use another line. This is quite easy to do and becomes second nature after a short while.

When you have finished the body of your letter, please "sign" it (we prefer that you sign all correspondence with your real name) and press CONTROL-Z. It will then be sent to the people you have indicated.

That's all there is to sending a letter! If you don't believe me, try it. Send one to yourself. To do this, all you need to do is answer the `TO:` prompt with your

---

Cray Augsburg is RAINBOW's technical editor and has an associate's degree in electrical engineering. He and his wife, Ruth Ann, have two children and live in Louisville, Kentucky. His username on Delphi is CRAY.

Database Report

Activity on both OS-9 Online and the CoCo SIG has been lively in spite of the recent holiday season. Many users received new CoCos or software as Christmas presents and are now using them to produce utilities, pictures and other programs they want to share with the CoCo population.

Joe Carney (JOECARNEY) helped us to do some testing in early November to determine the speed of downloading from Delphi using Xmodem versus Ymodem at 300, 1200 and 2400 bits per second. As it turns out, Ymodem is roughly 10 percent faster than Xmodem at 300 bps, 20 percent faster at 1200 bps, and 30 percent faster at 2400 bps.

Few CoCo terminal programs support Ymodem at present, although we expect that to change shortly. If you have a terminal program that supports Ymodem, you may want to use it online for faster downloads. (A Ymodem patch for Version 2.0 of *Rickeyterm* and the CoCo 3 is available in the Data Communications topic of the CoCo SIG's database.)

OS-9 Online

In the General topic area, **Rix Seacord** (RIX) uploaded his review of the Burke & Burke interface. **Chris Burke** (COCOXT) uploaded a very informative description of the hard drive system available from Burke & Burke detailing what is included, what is needed, and where to obtain all the hardware. Chris also furnished the Burke & Burke application notes #1 and #2. **Kevin Darling** (KDARLING) uploaded a text file that gives a brief description of *Multi-Vue*. **Paul Kacprowicz** (PAK) uploaded an article that gives his impressions of the *Flight Simulator II* program from SubLogic. **Jonathan Guthrie** (SCIGUY) uploaded a documentation file for the Ymodem protocol. **Greg Law** (GREGL) provided a documentation file for the calling syntax for all of the functions in the CGFX.L library in the Developer's System. **Bill Brady** (WBRADY) uploaded several text articles dealing with starting up OS-9/68K on an Atari system.

In the Patches topic area, **Ken Scales** (KSCALES) uploaded *CC3PAK*, which will

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TEXTPRO IV is the most Powerful Word Processing System available for the COCO-3, designed for speed, flexability and extensive document processing. It is not like most of the other word processing programs available for the Color Computer. If you are looking for a simple word processor to write letters or other short documents, and never expect to use multiple fonts or proportional printing, then most likely you'll be better off with one of the other simple word processors. But, if you want a powerful word processor with extensive document formatting features to handle large documents, term papers, manuals, complex formatting problems and letter writing, then TEXTPRO IV is the answer. It works in a totally different way than most word processing programs. It uses simple 2 character abbreviations of words or phrases for commands and formatting information that you imbed directly in your text. There are over 70 different formatting commands you can use without ever leaving the text your working on. There are no time comsuming and frustrating menu chases, you are in total control at all times. You can display the formatted document on the screen before a single word is ever printed on your printer. Including margins, headers, footers, page numbers, page breaks, column formatting, justification, and Bold, Italic, Underline, Double Width, Superscript and Subscript characters.

TEXTPRO IV can even support LASER PRINTERS with proportional fonts, take a good look at this AD? It was done with TEXTPRO IV on an OKIDATA LASERLINE-6 laser printer!!! All of the character sets used on this AD are proportional, all centering, justification, font selection, and text printing was performed automatically by TEXTPRO IV.

What you see is what you get!

TEXTPRO IV has 9 Hi-Resolution screen fonts to choose from, with 58 to 212 characters per line in 225 Resolution, for the best display possible. You can easily match the width of your printed page to the screen and you can have it automatically change display widths as you change printer fonts so you can even display the "fine print". All of the screen fonts can display, Bold, Italic, Underline, Superscript, Subscript and Double Width characters. When you you want to see what your printed document will look like, TEXTPRO IV will let you see it on the screen in all its glory, so that, "What you see is what you get".

Standard Commands

TEXTPRO IV has all the document formatting commands you expect in a word processor and then some. The setup commands include: line length, top margin, bottom margin, page length, page numbering on/off, page format on/off, automatic word fill on/off and justification left, center, right or full. Some of the Vertical control features include: Test for a number of lines left on a page, skip to next page, set page number, page pause, single and multiple line spacing.

TEXTPRO IV features 3 programmable Header lines that can be centered, left or right justified and one programmable Footer line. There are 3 commands for continious, single and paragraph indenting, Center Text, Center Line and Right Justify text with character fill.

Printer & Special Commands

TEXTPRO IV has 8 pre-defined printer & screen commands for Bold, Italic, Double Width, Underline, Subscript, Superscript, Condensed and Double Strike print. It also has 10 programmable functions that you can use to access intelligent printer features like: Graphics, variable line spacing, half line feed, horizontal & vertical positioning. There are also 3 other printer commands that allow you to imbed control code sequences anywhere in the text.

There is a Footnote command that will automatically place footnotes at the bottom of the page. Another command allows you to display a message on the screen and input text from the keyboard, to be included in your printed document. There is also a repeat command that allows you to repeat an entire document or part of one, up to 255 times.

Tab Functions

TEXTPRO IV features an elaborate system of tab commands for complete control over column formatting. There are 10 programmable tab stops that can be defined and re-defined at any time. They can be used to: Center over Tab column, Right Justify to Tab column, Decimal Align over Tab column, Left Justify to Tab column (Normal Tab) and Horizontal Tab. They can also be used with a numeric column position for maximum flexibility.

Proportional Fonts & Printing

TEXTPRO IV is the only Color Computer III Word Processing system that gives you Justified Proportion Printing, which can give your documents and letters that professional touch that just isn't obtainable with fixed or mono spaced printing. And just about all printers today support proportional fonts, and with Laser Printers you can get typesetting quality output for just pennies a page. TEXTPRO IV supports up to 9 proportional fonts, with full justification. And, you can even mix mono spaced and proportional fonts for maximum flexability. Even if you don't use proportional printing, you can select between Pica, Elite and Condensed fixed width fonts to get fully justified printing.

Mail Merge and Text Processing Disk Functions

TEXTPRO IV supports several commands that allow you to import data or text from other disk files. They allow you to include information like names and addresses for Mail Merge capability, Import standard paragraphs or other information for Boiler Plate type functions and more. Some of the commands include: Open a file, Field a Record, Read a Record into fielded variables, Read single or multiple lines and Trim spaces from the trailing end of fielded variables.

Another powerful disk function not to be overlooked is the "LIBRARY" command that allows you to include the entire contents of a file in your text. This can be very useful for a great many applications. You can use a Library command to automatically include a standard or optional printer setup command file, or to include standard paragraphs, headers or information created from a spread sheet or any other program. And, for printing very large documents that consist of several files linked together.

Autoexec Startup Files

TEXTPRO IV will automatically load and execute a command text file when it first executes. This allows you to customize the program configuration for your system and printer whenever you startup TEXTPRO IV. You can setup the screen display format, colors, adjust automatic key repeat, printer baud rate, load a set of function keys, load your printers control codes and more.

80 Programmable Function Keys

TEXTPRO IV allows you to have up to 80 function keys with just about any kind of information or command sequences you can imagine. Once programmed, you can have a command sequence execute using a single function key. You can also Save and Load function key sets at any time. So, you can have several sets for different writing tasks or projects, the possibilities are endless. Just think, with a single function key you could, load a disk file, search for and replace all the occurances of a phrase, save the file back to disk, have it processed and printed!

Text Editing

TEXTPRO IV has a powerful, full featured, line oriented screen editor that is faster and more efficient then most editors you've ever worked with. It supports single or multiple line copy and move, global or local search and replace, word and character insert/delete, block delete and much more. It features adjustable automatic key repeat, selectable display foreground and background colors, screen line width and more.

TEXTPRO IV uses fully compatible ASCII formatted files. You can even direct formatted output files to a standard ASCII disk file. It will Load, Save, Append, Kill, Text Process files from disk, Roll part of a file to disk, Get next portion of a file, display a Directory and Backup Ramdisk to & from Floppy disks.

TEXTPRO IV's files are also compatible with spelling checker programs like Spell 'n Fix from Star Kits, a shareware program, available with TEXTPRO IV for your evaluation, just for the asking.

Fully Buffered Keyboard

While many word processing programs are slow and often lose keystrokes. TEXTPRO IV has a fully buffered keyboard that is virtually impossible to out type. Even when it's busy, it will still remember the keystrokes *entered*. You can enter in commands or whatever, even during insert mode you'll never lose a key.

Professional Word Processing Power

TEXTPRO IV is a powerful tool for both the Casual and Professional Word Processing user. It offers a wide range of features and functions that can satisfy even the most demanding writer. Even though you may not need all of TEXTPRO IV's power and flexability right now, its not a program that you can easily outgrow. As your needs and skills improve, you'll discover that you won't need to go out and buy another word processing program, TEXTPRO IV will already be ready and waiting. No Text Processing program available for the Color Computer III gives you more Text Processing Power than TEXTPRO IV. It can make your writing appear more professional than you ever thought possible. Check around, see what other word processing programs have to offer in terms of power, speed and flexability. When your finished comparing them against TEXTPRO IV, you'll see that it's the only real choice for the Color Computer III.

Requires 128K & Disk $89.95

To order TEXTPRO IV by mail, send check or money order for the *amount of* purchase, plus $3.00 for shipping & handling to the address below.
To Order by VISA, MASTERCARD or COD call us at (702) 452-0632
(Monday thru Saturday, 8am to 5pm PST)

CER-COMP LTD.
5566 Ricochet Avenue
Las Vegas, Nevada 89110
(702) 452-0632

Coming Soon: CoCo 1 & 2 versions of *TEXTPRO IV*

own username, respond to the `SUBJECT:` prompt, type a message, and press CONTROL-Z.

Now, to see the message you have just sent, type `READ/NEW` at the `MAIL>` prompt and it will be displayed. (Each time you enter Mail, the system will default to `READ/NEW` in order for you to see any messages entered.) When you are satisfied that electronic mail works, send a few letters to other people. You might want to learn more about Mail while you are there, too. Just enter `HELP` at the `MAIL>` prompt and let Delphi teach you. To leave the Mail area and return to the CoCo SIG prompt, just press CONTROL-Z.

On to Forum

Posting a Forum message is almost as simple as sending electronic mail. And, if privacy isn't necessary, using the Forum for asking questions and posting ideas is preferred. By keeping such communication in public view, others can follow our thoughts. They might be able to back up our suggestions. And we also stand a much better chance of having our questions answered quickly. It isn't uncommon to ask a question in Forum on a Saturday night, log off for an hour and come back to find two or three responses.

To get to the Forum area from the CoCo SIG prompt, simply type `FORUM`, or use the abbreviation `FO`, and press ENTER. Once there, you might want to scroll through some existing messages to get a feel for the layout. To do this, just press ENTER. Every time you press ENTER, you will continue forward. If you come across a `MORE?` prompt, press ENTER.

If you come across a message you would like to respond to, enter `REPLY`. Delphi prompts you with `TO:`. Now look up at the top of the message to which you are replying, get the username and type it in. Or you can simply press ENTER. If you choose the latter method, you will be taken immediately to the text entry mode. This mode works just as it did in Mail. Do remember to cut your lines short on the right side of the screen.

Topics

General Information
Info on Rainbow
CoCo 3 Graphics
Archives
Source for 6809 Assemblers
HELP
Utilities & Applications
Product Reviews & Announcements
Hardware Hacking
Rainbow On Tape
Games
Data Communications
Classic Graphics
Music & Sound

Figure 1

If you type in the username (after all, you might also want to "reply" to someone else), you are prompted with `SUBJECT:`. Again, just like in Mail, enter a short description here. The last prompt before getting to text entry is `TOPIC?`. You can pick one of the Delphi topics presented in Figure 1 for entry at

patch *CC3IO* to allow the Level I version of *DynaStar* to work with Level II. He also uploaded `KEYTAB01.AR`, which patches *CC3IO* (Level II) to provide the capability of selecting an alternate mapping for up to 23 of the non-alpha key codes. The two key maps may be toggled independently on a window basis. The alternate key map included allows the arrow and function keys to be used under *DynaStar*. Chris Burke uploaded a short text file that describes a fix to Version 1.3 of the Burke & Burke drivers, which have a problem with masking the interrupts. **Bruce Isted** (BRUCEISTED) uploaded `SSCLK.AR`, a Level II clock module patch for Speech Systems' *RTC*; `PCPAK.AR`, a file describing the hardware modification to allow the PBJ P-C Pak to work with a CoCo 3 running OS-9 Level II; *PCPAK.AR Update*, a revision that includes CoCo 3 clock patches and printer drivers for the PBJ P-C Pak; and `SSPAK.AR`, a file that describes the hardware modification for the Speech & Sound Pak to enable it to run on a CoCo 3 at 1.78MHz. **Denny Skala** (DENNYSKALA) uploaded a one-byte *ACIAPAK* module patch that extends the character "cushion" between its sending an XOFF signal to the host and the end of its input buffer.

In the Graphics and Music topic area, **Steve Clark** (STEVECLARK) uploaded a program to display *McPaint* graphics pictures from the Macintosh into the CoCo 3 screens under OS-9. **Gene Loefer** (GLOEFER) gave us a very nice program that generates graphics images based on the Mandelbrot functions. Several RLE pictures have been posted by Steve Clark. Steve also uploaded the source and binary versions for the VDG and window screens and a printer dump for the Tandy DMP series printers. **Steve H. Fravel** (OS9FANATIC) uploaded the humorous 1988 Andy Capp Calendar, which features Andy doing his favorite thing.

In the Device Drivers topic area, **Craig Aarseth** (CRAIGAA) uploaded a file that describes the changes to the hardware and software to allow the PC-Pak to function under OS-9 Level II. **Brian Stretch** (BRIANSTRETCH) uploaded the source and object code for a driver for the JFD-CP Parallel Port under Level II. **Tim Sirianni** (TDS) uploaded a device driver and descriptor for a RAM disk driver for the Disto RAM disk card. **Dennis Weldy** (OS9ER) uploaded `WINDOWS.AR`, which contains binary copies of window descriptors w8-w15.

In the Programmers Den topic area, **Jim Johnson** (REINDEER) uploaded a PIA definitions file that defines the PIA registers and bits for the two PIAs in the CoCo 3. Jim also uploaded a "Floppy Disk Defs File" to the Programmers Den database topic area. This is a complete breakdown of the registers and commands of the WD1773/MB8877A floppy disk controller chip used by the Tandy Disk Controller. SIGop Greg Law updated his stand-alone program that allows a user to execute system calls from the command line. This version allows system calls returning packets of data to be executed and dumps the packets to disk files, which can then be examined with the *DUMP* utility. **Ray McCoppin** (RAYMCCOPPIN) sent us three C programs called *Frame*, *PI* and *Cmouse*.

In the Users Group topic area, over 40 files were added as we continue to bring more and more of these valuable files online.

In the Applications topic area, **Joel Sherman** (JSHERMAN) uploaded an address database program written in BASIC09. **Pat Abramovitch** (HUBBS) uploaded *Check09* to the Applications database topic area. This is a mouse-driven checkbook program that works on graphics screens. Dennis Weldy uploaded `DS.INIT`, which redefines (among other things) the cursor movement commands available through the arrow keys.

In the Utilities topic area, **Michael Washburn** (COMPZAP) uploaded *PSET*, a printer setup and menu program, and *DOWN*, a utility for Gemini and Star printers with character download capability, to allow the user to design his or her own printer fonts or use the Level II screen fonts. Greg Law published *Code*, a program that translates an input character into an output string of the form: character, hexadecimal, decimal and octal values. Greg also provided *Merror*, which is a self-contained program similar to *Error*, which keeps the `errmsg` file in memory along with some descriptive text of the error (helpful for those who make lots of errors). **Warren Moore** (WJMOORE) uploaded *SELECT16*, which displays 16 colors of the user's choice on the 320-by-192 screen, and *SPLIT*, which will split an ASCII file into several smaller files as specified by the number of records or the number of bytes.

*** *** *** *** COLOR COMPUTER III SOFTWARE *** *** *** ***

CBASIC III EDITOR/COMPILER

The ULTIMATE Color Computer III BASIC COMPILER!!!

If you want to write fast efficient machine language programs and you don't want to spend the next few years trying to learn how to write them in Assembly language or with a cheap compiler, then CBASIC III is the answer!!!

CBASIC III is the only fully integrated Basic Compiler and Program Editing System available for the Color Computer 3. It will allow you to take full advantage of all the capabilities available in your CoCo-3 including 512K RAM, without having to spend years trying to learn assembly language programming. CBASIC III allows you to create, edit and convert programs from a language you are already familiar with Enhanced Disk Color Basic, into fast efficient machine language programs easily and quickly. CBASIC III supports all the enhanced hardware available in the CoCo-3, including Hi-Res Graphics, & Screen displays, Extended Memory and Interrupts (Keyboard, Timer, Serial & Clock). We even added advanced commands not available in Basic to give you a level of control only avialable to very advanced Machine Language Programmers. Plus we made it exceptionally easy to use, not like some other compilers. CBASIC III is the friendliest and easiest compiler available for the Color Computer III.

CBASIC III is a powerful tool for the Beginner as well as the Advanced Basic or Machine Language programmer. You can write programs without having to worry about the Stack, DP Register, memory allocations and so on, because CBASIC III will handle it for you automatically. For Advanced users, CBASIC III will let you control every aspect of your program, even generating machine code directly in a program easily.

CBASIC III features well over 150 Compiled Basic Commands and Functions that fully support Disk Sequential and Direct access files, Tape, Printer and Screen I/O. It supports ALL the High and Low Resolution Graphics, Sound, Play and String Operations available in Enhanced Color Basic, including Graphics H/GET, H/Put, H/Play and H/DRAW, all with 99.9% syntax compatibility. CBASIC III also supports the built in Serial I/O port with separate programmable printer & serial I/O baud rates. You can send and receive data with easy to use PRINT, INPUT, INKEY, GETCHAR and PUTCHAR commands.

CBASIC makes full use of the powerful and flexible GIMI chip in the Color Computer 3. It will fully utilize the 128K of RAM available and install 2 Ultra Fast Ramdisks if 512K is available, for program Creation, Editing and Compilation. You can easily access all 512K of memory in a Compiled program thru several extended memory commands that can access it in 32K or 8K blocks and single or double bytes.

CBASIC has its own completely integrated Basic Program Editor which allows you to load, edit or create programs for the compiler. It is a full featured editor designed specifically for writing Basic programs. It has block move and copy, program renumbering, automatic line number generation, screen editing, printer control and much more.

The documentation provided with CBASIC III is an 8 1/2 by 11 Spiral Bound book which contains approximatly 120 pages of real information. We went to great lengths to provide a manual that is not only easy to use and understand, but complete and comprehensive enough for even the most sophisticated user.

CBASIC III is the most expensive Color Basic Compiler on the market, and well worth the investment. You can buy a less expensive compiler for your CoCo-3, and then find out how difficult it is to use, or how limited its features are. Then you'll wish you had bought CBASIC III in the first place. Dollar for dollar, CBASIC III gives you more than any other compiler available. If you can find a better CoCo-3 Basic Compiler then buy it!!!

Requires 128K & Disk $149.00

DATAPACK III PLUS V1.1

SUPER SMART TERMINAL PROGRAM

AUTOPILOT & AUTO-LOG PROCESSORS
X-MODEM DIRECT DISK FILE TRANSFER
VT-100 & VT-52 TERMINAL EMULATION

- No lost data even at 2400 Baud on the COCO-3 Serial I/O port.
- 8 Display Formats, 32/40/64/80 columns at 192 or 225 Res.
- 50K Text Buffer when using the Hi-Res Text Display & Disk.
- ASCII & BINARY disk file transfer support via XMODEM.
- Directly record receive data to a disk file (Data Logging).
- VT-100 terminal emulation for VAX, UNIX and other systems.
- VT-100/52 cursor keys, position, insert/delete, PF & Alt. keys.
- Programmable Word Length, Parity, Stop Bits and baud rates.
- Complete Full and Half Duplex operation, with no garbled data.
- 9 Variable length, Programmable Macro Key buffers.
- Programmable Printer rates from 110 to 9600 baud.
- Send Files directly from the Buffer, Macro Keys or Disk.
- Display on Screen or Print the contents of the Buffer.
- Freeze Display & Review information On Line with no data loss.
- Built in Command Menu (Help) Display.
- Built in 2 Drive Ramdisk for 512K RAM support and much more.

Supports: R.S. Modem-Pak & Deluxe RS-232 Pak, even with Disk.

Requires 128K & Disk, $59.95

EDT/ASM III

128/512K DISK EDITOR ASSEMBLER

EDT/ASM III is a Disk based co-resident Text Editor & Assembler. It is designed to take advantage of the new features available in the CoCo-3 with either 128K or 512K of memory. It has 8 display formats from 32/40/64/80 columns by 24 lines in 192 or 225 Resolution, so you use the best display mode whether you are using an RGB or Composite monitor or even a TV for your display. Plus you can select any foreground or background colors or even monochrome display modes. It will even support 512K by adding an automatic 2 drive Ultra Fast Ramdisk for lightning fast assembly of program source code larger than memory. There is also a free standing ML Debug Monitor, to help you debug your assembled programs. EDT/ASM III has the most powerful, easy to use Text Editor available in any Editor/Assembler package for the Color Computer.

- Supports Local and Global string search and/or replace.
- Full Screen line editing with immediate line update.
- Easy to use Single keystroke editing commands.
- Load & Save standard ASCII formatted file formats.
- Block Move & Copy, Insert, Delete, Overtype.
- Create and Edit files larger than memory.

The Assembler portion of EDT/ASM III features include:

- Supports the full 6809 instruction set & cross assembles 6800 code.
- Supports Conditional IF/THEN/ELSE assembly.
- Supports Disk Library file (include) up to 9 levels deep.
- Supports standard Motorola assembler directives.
- Allows multiple values for FCB & FDB directives (unlike R.S. EDT/ASM)
- Allows assembly from the Editor Buffer, Disk or both.

Requires 128K & Disk $59.95

TEXTPRO IV

"The ADVANCED COCO-3 Word Processing System"

- 9 Hi-Res Displays from 58 to 212 columns by 24 lines in 225 Res.
- On Screen Display of Bold, Italic, Underline & Double Width print.
- Up to 8 Proportional Character Sets Supported with Justification.
- Up to 80 Programmable Function Keys & Loadable Function key sets.
- Fully Buffered keyboard accepts data even duiring disk access.
- Autoexecute Startup files for easy printer & system configuration.
- 8 Pre-Defined Printer function commands & 10 Programmable ones.
- Supports Library files for unlimited printing & configurations.
- Disk file record access for Mail Merge & Boiler Plate printing.
- Completely Automatic Justification, Centering, Flush left & right.
- Change indents, margins, line length, etc. anytime in the text.
- Create and Edit files larger than memory, up to a full disk.
- Easily imbed any number of printer format and control codes.
- Built in Ultra Fast 2 drive RAMDISK for 512K support.

TEXTPRO IV is the most advanced word processing system available for the COCO-3, designed for speed, flexability and extensive document processing. It is not like most of the other word processing programs available for the Color Computer. If you are looking for a simple word processor to write letters or other short documents, and never expect to use multiple fonts or proportional spacing, then most likely you'll be better off with one of the other simpler word processors. But, if you want a powerful word processor with extensive document formatting features to handle large documents, term papers, manuals, complex formatting problems and letter writing, then TEXTPRO IV is what your looking for. It works in a totally different way than most word processing programs. It uses simple 2 character abbreviations of words or phrases for commands and formatting information that you imbed directly in your text. There are over 70 different formatting commands you can use without ever leaving the text your working on. There are no time comsuming, and often frustrating menu chases, you are in total control at all times. You can see what the formatted document will look like before a single word is ever printed on your printer. Including margins, headers, footers, page numbers, page breaks, column formatting, justification, and Bold, Italic, Underline, Double Width, Superscript and Subscript characters right on the screen.

TEXTPRO IV can even support LASER PRINTERS with proportional fonts, take a good look at this AD? It was done with TEXTPRO IV on an OKIDATA LASERLINE-6 laser printer!!! All the character sets used on this AD are proportional spaced characters, all centering, justification, and text printing was performed automatically by TEXTPRO IV.

Requires 128K & Disk $89.95

HI-RES III Screen Commander

The DISPLAY you wanted but didn't get on your CoCo-3

- 54 Different Character Sizes available from 14 to 212 cpl.
- Bold, Italic, Underline, Subscript, Superscript and Plain character styles.
- Double Width, Double Height and Quad width characters.
- Scroll Protect form 1 to 23 lines on the screen.
- Mixed Text & Graphics in HSCREEN 3 mode.
- PRINT @ is available in all character sizes & styles.
- Programmable Automatic Key repeat for fast editing.
- Full Control Code Keyboard supported.
- Selectable Character & Background color.
- Uses only 4K of Extended (2nd 64K) or Basic RAM.
- Written in Ultra Fast Machine Language.

HI-RES III will improve the standard display capabilities of the Color Computer 3, even the 40 and 80 column displays have several features missing. For example, you can't use PRINT @ or have different character sizes on the same screen, even when mixing text and graphics with the HPRINT command. Hi-RES III can give you the kind of display you always dreamed about having on your CoCo-3, with a wide variety of display options that you can easily use with your Basic or ML programs.

HI-RES III is totally compatible with Enhanced Color Basic and its operation is invisible to Basic. It simply replaces the normal screen display with an extremely versatile display package. With the full control code keyboard, you can control many of HI-RES III extended functions with just a couple of simple keystrokes.

Requires 128K Tape or Disk $34.95

512K RAMDISK & MEMORY TESTER

RAMDISK is an ALL Machine Language program that will give you 2 ULTRA High Speed Ram Disks in you CoCo-3. It does not need or require the OS-9 operating system. It works with R.S. DOS V1.0 or V1.1 and it is completely compatible with Enhanced Color Disk Basic! Plus it allows your CoCo-3 to run at double speed all the time even for floppy disk access!!! It will not disappear when you press reset like some other ramdisk programs. The MEMORY tester is a fast ML program to test the 512K ram. It performs several bit tests as well as an address test so you know that your 512K of memory is working perfectly.

Requires 512K & Disk $19.95

"The SOURCE III"

DISASSEMBLER & SOURCE CODE GENERATOR

The SOURCE III will allow you to easily Disassemble Color Computer machine language programs Directly from Disk and generate beautiful, Assembler compatible Source code.

- Automatic label generation and allows specifying FCB, FDB and FCC areas.
- Disassemble programs Directly from disk, unlike other disassemblers.
- Automatically locates Begin, End and Execution address.
- Output Disassembled listing with labels to the Printer, Screen or both.
- Generates Assembler source files directly to disk or printer.
- Built in Hex/Ascii dump/display to locate FCB, FCC & FDB areas.
- 8 Selectable Display formats 32/40/64/80 columns in 192 or 225 Res.
- Selectable Foreground & Background colors & Printer Baud rates.
- Built in Disk Directory an Kill file commands.
- Menu display with single key commands for smooth, Easy operation.
- Written in Ultra Fast Machine Language.

Requires 128K & Disk $49.95

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(702) 452-0632

this prompt. Most people enter `GEN` (General Information) whether or not their message is general in nature.

When you are finished typing your message (be sure to sign it), use CONTROL-Z to "post" the message for others to see. If you want to abort the message at any point, use CONTROL-C just as you did in Mail.

If there isn't a specific message to which you want to reply, but you do want to leave a message for others to see, enter the `ADD` command at the `FORUM>`prompt. You will be asked for the same information as in `REPLY`.

Many times, we don't want to ask a question of just a single user. Instead, we want to leave the message for all SIG members to see. If this is the case, when Delphi sends the `TO:` prompt, enter `ALL` instead of a single username. ☐

Jason Forbes (COCO3KID) provided C source code for *Modbuster*, a program to split merged executable files and BASIC09 procedure files into their individual files. Dennis Weldy uploaded the C source code for *FILESTAT*, which reads the file descriptor sector for a given list of files and then prints its contents (except for the cluster list). Files may be given on the command line or accepted from standard input. **Bert Challenor** (BERTAC) updated his OS-9 spooler program.

In the 68K-OS9 topic area, Bill Brady uploaded *BIGT-ST*, a BASIC09 terminal program similar to *BigT* for the CoCo.

In the Telecommunications topic area, Greg Law published an autobaud version of *TsGo/Tsmon*. **Simmule Turner** (SIMMY) uploaded *CTALK*, a demonstration version of a terminal program that features VT52 emulation, and its associated documentation. **Ernest Fielder** (DOUGAL) uploaded *Remote*, a program to link two devices for communication.

CoCo SIG

In the General Information topic area, **Kevin Nickols** (NICKOLS) posted the Tandy newsletters for November and December. **Michael Fischer** (MIKE88) posted two very humorous files, one called "UnixWars" and the other being a "jived" version of the Gettysburg address. **Brian Wright** (POLTERGEIST) posted some inside news about Tandy's sales practices in a file called "Tandy Secrets Revealed."

In the CoCo 3 Graphics topic area, **Gregory Clark** (GNOME) uploaded *DUMPC16*, a screen dump program for a CoCo 3 and a DMP-120 printer. It uses Greg Miller's *GALLERY* program to view the pictures. **Bob Wharton** (BOBWHARTON) posted many more of his very popular renditions of the logos for various rock groups. Bob also posted an MGE picture of Sun Bowl '87. I (DONHUTCHISON) posted a Macintosh picture of the lovely Samantha Fox. **Greg Miller** (GREGMILLER) posted `HOLIDAY.MGE`, a holiday scene that he drew with *Color Max Deluxe*. Greg also provided us with new versions of his very popular *BSCTOOL* and *GALLERY* utilities. **Richard Trasborg** (TRAS) was this month's most prolific uploader, providing us with memorable pictures of the new year '88, several female movie stars, Linda Ronstadt and Hyapatia Lee, a humorous cartoon involving the Fuller brush man, and `GIRLNUD2/CM3`. Richard also posted several popular nude *CoCo Max III* drawings by Mike Trammell, including those called Tahiti, Geisha2, Windyday, Joselene, Sally Field and other assorted nudes. In addition, Richard uploaded a Madonna collage drawn by his friend Stephen Knell using *CoCo Max III*. **David Mills** (DAVIDMILLS) posted a nicely colored map of the USA in MGE format. **Brian McElroy** (RFITZHUGH) sent us several pictures and zodiac signs drawn with *The Rat*, a new CoCo 3 drawing program. **Michael Talcott** (MIKETALCOTT) sent us his picture color editor, which allows one to redefine the palette used in an MGE picture while viewing it, and **Mike Andrews** (MANDREWS) uploaded an MGE picture displaying a CoCo 3. Jason Forbes sent us a "Money For Nothing" picture and a digitized picture of Michael J. Fox. **Bob Tarburton** (BOBTARBURTON) furnished us with his color separation programs, and **Chris W. Brown** (CRISPWILLIAM) sent us several pictures that he drew with *CoCo Max III*. I posted the "CoCo Gallery" files from RAINBOW for the months of February, April, June, July, August and September. **Jim Shoop** (BAZAR) sent us his utility program for converting *CoCo Max II* fonts into a format usable by *CoCo Max III*. Brian Stretch sent us a *CoCo Max III* viewer utility and a picture of his Falcon's Lair BBS. **Ken Schunk** (KENSCHUNK) sent us a *QuickBASIC* program that will let IBM PC owners display all of our great MGE pictures on an IBM PC or clone equipped with an Enhanced Graphics Adapter. **Christian Erickson** (CE) sent us a picture from the game *Tron*.

In the Source for 6809 Assemblers topic area, **Roger Krupski** (HARDWAREHACK) posted the source code for a 512K RAM disk for the CoCo 3.

In the Utilities & Applications topic area, Bob Wharton published a disk directory label maker and some utilities for making calendars using *CoCo Max III*. **Laurence Tepolt** (TEPCO) uploaded a binary tree tutorial that includes a sample program. **Jim Sanford** (WB4GCS) sent us his fine RTTY utility, *Smarty*, for the CoCo 3. **Ray Dutton** (GEMINI06) sent us his *EDTASM+* source code conversion program, and **Ezra Story** (EZY) uploaded *CC3WRITE*, a first-run word processor for the CoCo 3. Brian Stretch sent us a line editor called *CoCoWord*, and **Roy Cosby** (UNCLE) gave us a bowling game and his *NewBoot* program. **David Mills** (DAVIDMILLS) sent us `DOSTAMER.BIN`, a program that will automatically load and run a program when a user enters the `DOS` command. Jason Forbes sent us a real-time clock program, and Brian Wright sent us *The DiskPlumber* repair utility. Roger Krupski provided his Disk *EDTASM* patches for operation on the CoCo 3.

Hint . . .

Nailing It Down

If you're into some minor hardware hacking and want to offer your CoCo and Multi-Pak a little more protection, consider the following option. The particular approach is up to you, but many have found it advantageous to bolt the CoCo and MPI together to one piece of plywood. This will keep those "minor" bumps from destroying the valuable electronics inside. If you are a little queasy about opening the units (this will void the warranty), ask your local hardware hacker for a little help.

Hint . . .

Locked Out

Have you ever been typing in a program listing, gone to get a cup of coffee and come back only to find that your CoCo is locked up and won't accept any characters from the keyboard? Of course! It must have been the kids! But is the CoCo really "locked up"? Any time your CoCo decides it doesn't want any characters, check the joysticks. If a firebutton is pushed in, the keyboard becomes inactive. And it is easy to accidentally bump a joystick so that the firebutton presses against something.

Ned M. Taggart
Navarre, OH

In the Hardware Hacking topic of the database, **Marty Goodman** (MARTYGOODMAN) published his EPROM and Static RAM Pinout charts. This group contains three files, each file being a table of pinouts for EPROM and/or static RAM chips. Marty has donated these charts to the Public Domain. Marty also provided us with the driver fix for the hard drive system from Burke & Burke. (This file will be made available to all registered owners, but was published online so that users could receive it faster.) **John Malon** (JOHNLM) published a file describing a modification to the Avatex 1200 modem to provide external carrier detection. **Logan Ward** (LOGANWARD) sent us a CM3 picture describing how to add a switch to a Radio Shack Hi-Res adapter so that a single adapter may be used with both *Color Max 3*, *Color Max Deluxe* and *CoCo Max III*. **Stan Stephenson** (MINSTREL) sent us his humorous interpretations of the specifications for both the RS-422 standard and the electronic specifications for the RS-232 standard.

In the Games topic of the database, **Colin McKay** (COLINMCKAY) posted a description of how to put *The Interbank Incident* onto a 512K Disto RAM disk. **Kyle Petree** (KYLE) uploaded a "Dungeon Master Helper" and a "Dungeons & Dragons" character sheet generator. **Fred McDonald** (FREDMCD) sent us his fine PROPERTY.BAS program, a BASIC utility for use with the game of Monopoly. **Michael Schneider** (MSCHNEIDER) sent us two archived (compressed) files with two shareware games from Ark Royal.

In the Classic Graphics topic area, **Tom Bedwell** (REBECCA) uploaded a two-disk set that tells "The Christmas Story" using graphics, music and text. **Emery Mandel** (EMANDEL) uploaded Mike Ward's popular RLE-to-binary convertor program with Mike's permission. I posted the "CoCo Gallery" winners for the months of February, April, June, August and September.

In the Music & Sound topic of the database, **James Predinger** (JIMBOPREDIG) uploaded his renditions of several of Willie Nelson's greatest hits.

In the Archives topic of the database, Greg Miller posted the Forum messages and the Conference from the first BattleLine. **Dick White** (DICKWHITE), the SIG's polls manager, posted 108 archived polls from the Polls section of the SIG.

In the Product Reviews & Announcements topic of the database, Roger Krupski posted a description of his hard drive system at the request of several SIG members. This 25K file is actually most of the documentation for the product, and should be interesting reading for those considering upgrading to a hard disk system. Marty Goodman posted his review of the Disto "No Halt" floppy disk controller and another review of the No Halt disk controller and the 512K RAM upgrade board from Performance Peripherals. Christopher Burke posted Burke & Burke Application Note #1, and Michael Schneider posted his review of *Flight Simulator II*.

In the Data Communications topic area, **Steve Lamb** (STRINGFELLOW) posted the 11/16/87 version of the popular *Ultimaterm* terminal program. **Billy Douglas** (BILLYDOUGLAS) posted the documentation for the *CoBBS* systems. **Mike Ward** (MIKEWARD) uploaded Version 4.7 of his always-popular *MikeyTerm* terminal program. Fred McDonald posted a collection of several letters from Ken Johnston (the author of *Ultimaterm*) to the Delphi users, and *Ultimaterm 3.0* with supporting utilities.

As you can see, we have a lot of new and very good material online for our CoCo users. See all of you online on Delphi!

— Don Hutchison
Rainbow CoCo SIG
Database Manager

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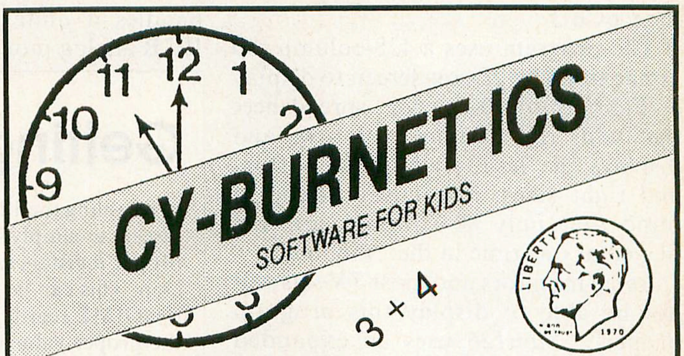

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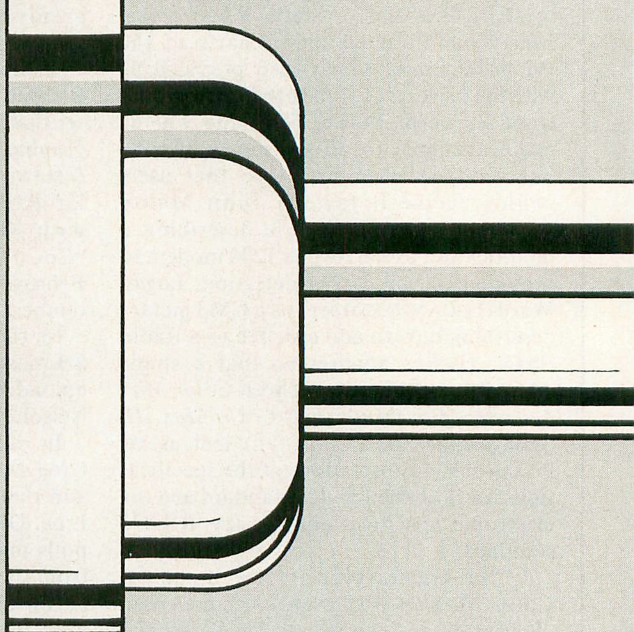

By David Archer

Sum128 is a simple spreadsheet that demonstrates some relatively unknown text screen modes on the CoCo 3.

The program uses a 128-column (80 at one time) by 28-row screen to display a 12-month by 20-category spreadsheet that adds the columns and rows and displays the results along the bottom and right sides, respectively. Keep in mind that only 80 columns are displayed at one time in the "window."

Some monitors and most TV sets will not be able to display this program properly. *Sum128* uses an expanded screen display, some of which may not fit onto your screen. But if you're using Tandy's CM-8 monitor or something similar, you won't have any problems.

If your monitor or TV will display the normal 80-by-24 screen, you won't have any trouble with the horizontal display from *Sum128* — but you may have problems with the increased vertical display, 28 rows compared to the normal 24 rows.

On my TV set, the top and bottom rows, as well as the right side, are for the most part cut off. The set just wasn't designed for displaying that much. My BMC monochrome monitor does much better but is still barely able to contain the entire screen. My CM-8 monitor handles it quite easily, as do similar RGB analog monitors.

I've included a short program (`MONTEST`) that outlines an 80-column by 28-row text screen. With it you can judge for yourself whether your monitor is suited for use with *Sum128*. That may

Getting Text In 128x28

Enabling the 128-column by 28-row text screen is simply a matter of setting the proper registers within the CoCo 3 GIME chip. This can be accomplished by poking the GIME register's memory address with the proper value (see lines 420 and 430 of *Sum128*). Refer to Table 1 for a more detailed look at the three GIME registers used in this program. These are not *all* the GIME registers, just the ones used in *Sum128*.

What follows is perhaps a bit technical, but I feel it's necessary to explain exactly how this unusual screen mode works. If you're not interested in this part, skip on to another.

Exploring the GIME

Numbers with the prefix &H are hexadecimal numbers. Numbers with no prefix are decimal. And numbers like 00000011 are eight-bit binary representations. Eight-bit binary numbers are formatted with Bit 7 as the leftmost bit and Bit 0 as the rightmost bit.

The first GIME register set is at &HFF98. You'll see that by storing &H03, we set bits 1 and 0 (&H03 = 00000011). If you look at Table 1, you'll see that means we've set the register for text mode with eight lines per character row. (This is also accomplished by the BASIC command `WIDTH 80`.)

Next is the video resolution register at &HFF99. By storing &H75 there we set bits 6,5,4,2 and 0 (&H75 = 01110101). Again, if you refer to Table 1, you'll note that by setting bits 6 and 5 we set the lines per field to 225 lines (225 lines of screen). That means that if we have 225 lines and eight lines per row, we can display 28 rows on the text screen! Actually, 28 * 8 = 224 lines, so we have one extra line displayed at the very bottom of the screen. More about that extra line later.

Bits 4 and 2 set the horizontal resolution bits, and Bit 0 sets CRES0. That allows the use of attribute bytes with the text (underline, blinking and color). BASIC normally stores &H15 in this register when the command `WIDTH 80` is executed (&H15 = 00010101). So, you can see that the only thing we did differently from BASIC was to increase the lines per field from 192 to 225.

The most extensively used register in this program is the horizontal offset register,

---

Dave Archer is a grain farmer and CoCo programmer. He and his wife, Jodi, a registered nurse, live on a farm near Finley, North Dakota.

```
   Item           Jan     Feb     Mar     Apr     May     Jun     Jul     Aug     Sep     Oct     Nov     Dec            Total

Store No. 120  6354.21 7234.32 4325.23 3214.43 5436.54 4325.34 6545.42 5784.87 6547.56 7654.34 8765.34 9875.91       76063.51
Store No. 121  6545.23 8764.43 8764.23 5345.87 6545.87 5436.34 9874.20 7234.92 7384.82 7365.47 8293.93 9912.61       91467.92
Store No. 122  3648.27 3734.23 4958.18 2958.64 3874.54 3986.37 2748.75 4348.30 3396.79 5007.87 5298.19 7350.34       51310.47
Store No. 123  8532.43 7354.78 6475.98 5897.23 6235.54 6453.12 7984.65 4765.98 7129.54 8653.41 8954.96 9346.54       87784.16
Store No. 124  6432.76 5463.83 5498.23 7002.94 6572.79 6453.76 6250.56 6395.87 7409.54 6547.23 7231.40 7389.04       78647.95
Store No. 125  2965.56 2465.62 3956.21 3194.34 3216.45 2349.05 4325.66 4487.23 3997.70 3566.08 2777.45 3665.92       40967.27
                  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00           0.00
                  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00           0.00
                  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00           0.00
                  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00           0.00
                  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00           0.00
                  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00           0.00
                  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00           0.00
                  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00           0.00
                  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00           0.00
                  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00           0.00
                  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00           0.00
                  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00           0.00
                  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00           0.00
                  0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00           0.00

  Total        34478.5 35017.2 33978.1 27613.5 31881.7 29004.0 37729.2 33017.2 35866.0 38794.4 41321.3 47540.4      426241.28
```

save the agony of typing in all the code only to be unable to display the results properly. Also, you can use `MONTEST` as a basis for developing your own applications using the expanded screen area. I've added quite a few comment lines to both `MONTEST` and `SUM128` for just that purpose as well as for additional explanation.

Running *Sum128*

When you first run *Sum128* you'll be asked whether you are using a tape or disk system. Simply press the T or D key. Then you will see the entire screen with a blank worksheet (all values are zero). You are now at the main menu. On the fourth row is the command line, which always has the available commands on it. You'll note that by pressing the left or right arrows you're able to scroll the entire worksheet across the screen.

Pressing the F1 key brings you to the command mode, where most of the commands are used. Again, the fourth row is the command line showing the available commands.

---

which is located at &HFF9F. This is the register that enables the 128-column wide screen. It also controls where the 80-column "window" is located within the 128-column virtual screen. Use this formula:

```
POKE &HFF9F,128 = X
```

X is the column number (0 through 127) you want to be displayed leftmost within the 80-column window.

The reason we must add 128 to the column number is that the value 128 decimal, &H80 in hex (10000000 in binary), sets Bit 7 of the register, which is the 128-column enable bit. Bits 6 through 0 specify the offset column number. Refer to Table 1. Some examples are shown below. * These examples show how to display the right columns of the 128-column screen as the left portion of the window and show the left columns of the 128-column screen as the right portion of the window.

Command	**Columns displayed in 80-column window**
`POKE &HFF9F,128 (10000000)`	0 through 79 (like normal 80-column)
`POKE &HFF9F,168 (10101000)`	40 through 119
`POKE &HFF9F,192 (11000000)`	64 through 127 and 0 through 15 *
`POKE &HFF9F,255 (11111111)`	127 and 0 through 78 *

I hope you now have an idea of how we can use this register to scroll or switch the 80-column window to anywhere within the 128-column screen.

Fixing BASIC

The problem with using this screen mode is that it's not supported by BASIC. Luckily, the CoCo 3 BASIC interpreter is in RAM, so with a few careful pokes we can fix that, too. These are done in lines 450 through 520 of *Sum128*.

BASIC Vectors

BASIC vectors are used by BASIC when writing the text screen. &HFE00 and &HFE01 is the cursor address. Set to &H2000 (top of screen memory). &HFE04 is the number of characters per row on the text screen; set to 128. &HFE05 is the number of rows on the text screen; set to 28. &HFE06 and &HFE07 is the end address of text screen memory; set to &H3E00.

Each row of text is 128 characters long and each character needs two bytes — one for the actual character and the other for attributes. The attribute byte contains the color, blinking or underline information. That means we need 256 bytes of memory for each row of text displayed. So, with 28 rows of 256 bytes (28 * 256 = 7,168), we need 7,168 (1C00 in Hex) bytes of screen memory.

The beginning of Hi-Res text screen memory for BASIC is at &H2000. Adding &H1C00 to &H2000, we come up with &H3C00. So why did I set the end address to &H3E00? Well, by adding the extra memory we can print over that one line (not row) of screen at the very bottom, as I mentioned earlier. Also, this keeps BASIC from trying to scroll when we do print over that line. BASIC's scroll routine will destroy the 128-column format.

Fixing BASIC's `LOCATE` command was a little more tricky. This involved patching the machine code instructions that execute the `LOCATE` command, and is accomplished in lines 500 through 520.

Note that not every BASIC command was patched for use with this screen mode. If you develop your own applications, some commands may not behave as they normally do. One such example is trying to print more than 29 rows on the screen. BASIC's scroll routine still thinks that each line is only 80 columns wide, so when the scroll executes, the result is a mess. □

(F)ile I/O	allows saving or loading of worksheet files, which can also be edited with an ASCII word processor.
(M)ain menu	jumps back to the main menu.
(P)rint	allows printing of entire worksheet.
Arrow keys	allow you to move to any cell (except the totals and category areas) within the worksheet for entry of new value.
(ALT)	moves cursor back to upper-left cell of worksheet. Pressing the @ key gives the same result.

When you have the cursor (highlighted area) over the cell you want to edit, simply type the number you want to store there and press ENTER (do not use commas in your entries — 5000, not 5,000, for example). The number must be lower than 10,000 or you'll hear a beep and the old value will be restored in the cell.

Please note that the first number key you press will be the first number of the cell. That is, when a number key is pressed, the program jumps to a LINE-INPUT routine. The input string is tacked on to the string containing the number key first pressed. The entire string is then evaluated as one number and stored in the current cell (see lines 1640 through 1710). The columns and rows are totaled after each cell is changed.

The best way to learn how to use *Sum128* is to run it. Try out the various features until you feel comfortable with the program.

Hard Copying Your Spreadsheet

The printer routine (lines 2240 through 2430) is set up to print in a condensed format of 17 characters per inch. The default is for Gemini 10X printers, but the code for most Radio Shack printers is included in a REM statement. Consult your printer manual for the specific codes for your printer.

If your printer doesn't support a condensed print mode, you might want to modify the routine to divide the sheet into two pages for printing. If your printer has a wide mode (132 columns), then you should not need condensed print — you can remove Line 2300.

Line 160 sets the printer speed to 9600 baud. If your printer requires a slower baud rate, you can change it there. Lines

```
GIME Register Table  (Courtesy of Kevin Darling)

This is by no means a complete table of GIME registers.  Only the
registers used are shown.  For more information you may wish to
purchase the Color Computer 3 Technical Manual.

Address
                   Contents
--------------------------------------------------------------------
FF98  Text/graphics video mode, and lines per row.
       Bit 7 = vidmode  0 is text, 1 is graphics
       Bit 6 = na
       Bit 5 = DESCEN    1 = extra DESCender ENable
       Bit 4 = MOCH      MOnochrome bit (1=monocrome) (composite only)
       Bit 3 = H50       50hz vs 60hz bit
       Bit 2 = LPR2      Lines per character row
       Bit 1 = LPR1        (Bits 2-1-0 below)
       Bit 0 = LPR0

                         000 - 1 line/char row     100 - 9  lines/char row
                         001 - 2                   101 - 10
                         010 - 3                   110 - 11 (??)
                         011 - 8                   111 - 12 (??)
--------------------------------------------------------------------
FF99  Video Resolution Register
       Bit 7 = na
       Bit 6 = LPF1          Lines Per Field bits
       Bit 5 = LPF0            "    "    "
       Bit 4 = HR2           Horizontal Resoloution bits

                      00 = 192 lines      10 = 210 lines
                      01 = 200 lines      11 = 225 lines
---------------------------------------------------------------
TEXT MODES
                      HR2  HR1  HR0       (HR1 don't care for text)
   80 Char/line        1    x    1
   64     "            1    x    0        CRES0 = 1 for attribute
   40     "            0    x    1                 bytes used
   32     "            0    x    0
---------------------------------------------------------------
GRAPHICS MODES    ( Horizontal Resoulution )
  X       Colors      HR2  HR1  HR0       CRES1   CRES0    Bytes/line
  640       4          1    1    1          0       1        160
  640       2          1    0    1          0       0         80

  512       4          1    1    0          0       0        128
  512       2          1    0    0          0       0         64

  320      16          1    1    1          1       0        160
  320       4          1    0    1          0       1         80
  320     · 2          0    1    1          0       0         40

  256      16          1    1    0          1       0        128
  256       4          1    0    0          0       1         64
  256       2          0    1    0          0       0         32

  160      16          1    0    1          1       0         40

Note the correspondence of HR2 & HR0 to the text mode's bytes/line.
--------------------------------------------------------------------
FF9F  Horizontal Offset Register
       Bit 7 = Horizontal offset enable bit  ( 128 char width always )
       Bit 6 =  -----I
       Bit 5 =       I
       Bit 4 =       I
       Bit 3 =       -->  Bits 6 - 0 specify the column offset (0 - 127)
       Bit 2 =       I
       Bit 1 =       I
       Bit 0 = ------I

If Bit 7 is set & in text mode, then there are 128 chars (only 80 seen)/line.
This allows an offset to be specified into a virtual 128 char/line screen.
Useful for horizontal hardware srolling on wide text or spreadsheets.

* Note that not all bits of each register are applicable to the program.
They are included only for continuity and reference.
```

Table 1

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163 through 167 have some alternate values. If you're unsure, check your printer manual for the proper baud rate setting.

File Input/Output

The files you save or load are automatically given the extension `.SUM` — so don't add an extension when asked for the filename. Also, filenames are restricted to eight characters or less. (That is, eight characters plus the extension.) If you enter more than eight, you'll hear a beep and you'll be asked to reenter the filename. If you're using a tape system, you'll be prompted with "Prepare tape and press <ENTER>" before any load or save operation.

You can edit the worksheet files you've saved to tape or disk by use of an ASCII word processor, or you can use the files in other programs.

The file format is this: Category string, 12 values (one for each month), and dummy separation string. For example:

Category 1	category
0000	January value
0000	February value
———	March through November values
0000	December value
*****	dummy string inserted for category separation
Category 2	
———	
Category 20.	

Final Notes

There are quite a few comments within the program listing, so if I've forgotten to explain something here, I hope you can figure it out from looking at the listing. If not, write to me and I'll try to figure it out.

Feel free to modify this program or develop your own applications using some of the things shown here. Customizing can be done by changing strings in the `DATA` statements in lines 2590 through 2780 to whatever best suits your needs. Remember that these strings cannot be more or less than 15 characters. Pad with spaces if less than 15 characters. This will allow you to rename the categories to something more meaningful than "Category."

(Questions or comments about this program may be directed to the author at Box 504, Finley, ND 58230. Please enclose an SASE when writing for a reply.) ☐

180	209	1570	255
360	41	1770	90
540	138	1930	3
770	128	2190	16
1030	28	2380	150
1200	178	2580	217
1400	236	END	160

Listing 1: `SUM128`

```
10 ' Sum 128
20 ' By Dave Archer
30 '
40 ' Special thanks to Roger Bou
chard for the fix to BASIC's LOC
ATE command
50 ' and to Dick White for his v
aluable suggestions.
60 ' Also to Kevin Darling for p
roviding GIME specs.
70 '
80 ' Palette colors set for RGB
analog monitor
90 '
100 RGB : 'Change to CMP for com
posite color monitor
110 PALETTE 0,8:PALETTE 1,18
120 PALETTE 2,63:PALETTE 3,0
130 PALETTE 4,0
140 PALETTE 8,63
150 X=1 :' 9600 baud
160 POKE 150,X :'set printer bau
d rate
161 'Baud              X =
162 '----             -----
163 '9600               1
164 '4800               7
165 '2400              18
166 '1200              41
167 ' 600              87
168 '
170 GOTO 240: ' if using monochr
ome then delete this line
180 '
190 ' * For monochrome *
200 FORX=0 TO 7 STEP 2:PALETTE X
,0:PALETTE X+1,63:NEXT
210 PALETTE 4,63:PALETTE 3,0:PAL
ETTE 2,63
220 'Change all "ATTR (1,3)" to
"ATTR (0,0)" for monochrome
230 '
240 CLEAR 2000
250 DIM MO(13,21),A$(21),B$(12),
M$(4)
260 ON BRK GOTO 1180
270 ON ERR GOTO 1280
280 CLS:POKE 65497,0:POKE 282,25
5: ' fast speed & upper case
290 WIDTH80:CLS1:PRINT:PRINT
300 PRINT TAB(7),"-< Sum 128 >-"
310 PRINT:PRINT
320 PRINT TAB(21)" By  Dave Arch
er"
330 PRINT:PRINT:PRINT
340 PRINT TAB(16)"(T)ape       or
    (D)isk  ?"
350 I$=INKEY$
360 IF I$="T" THEN DEV=-1:GOTO 4
00:' TAPE
370 IF I$="D" THEN DEV=1:GOTO 40
0:' DISK
380 GOTO 350
390 '  Set 128 by 28 screen
400 ONBRK GOTO 1170
410 CLS
420 POKE&HFF98,&H03:POKE&HFF99,&
```

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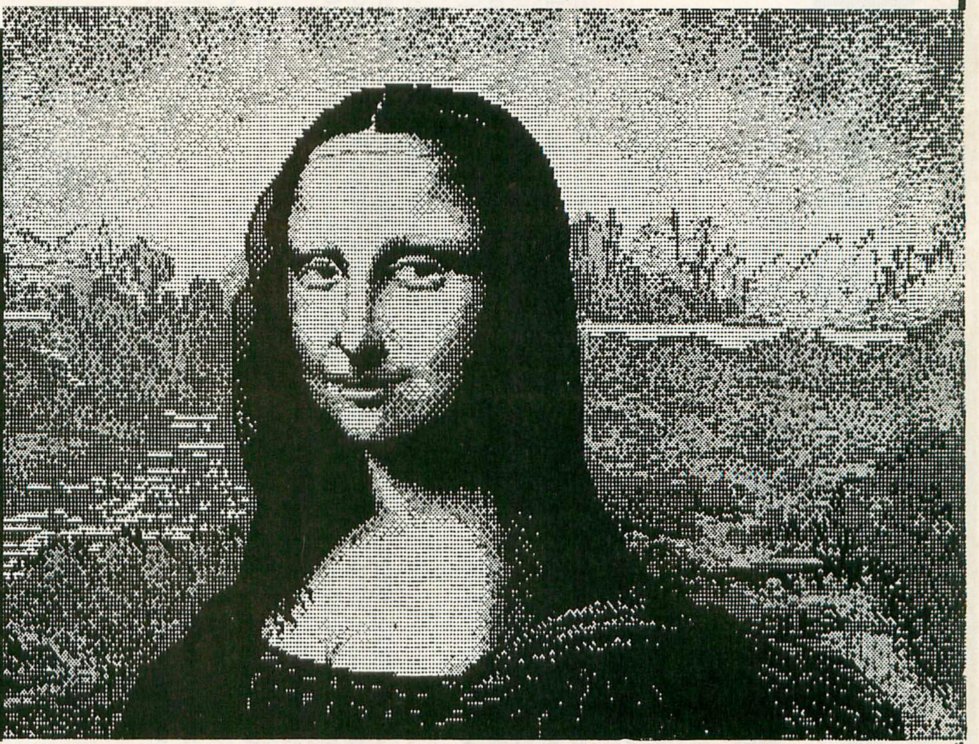

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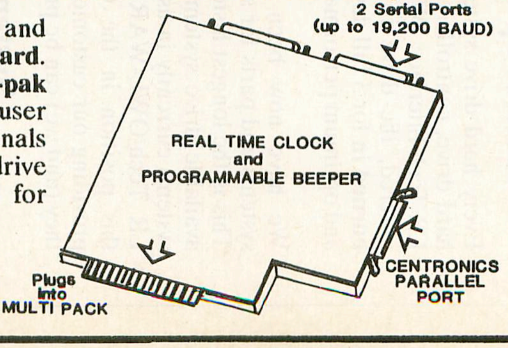
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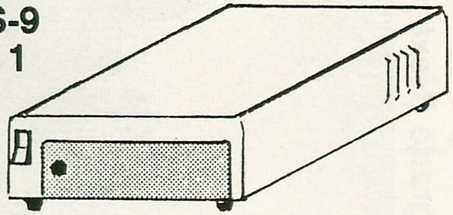

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```
H75: ' Set for 28 rows of text
430 POKE&HFF9F,128: ' Set for 12
8 columns with column 0 as left
most column
435 ' BASIC vectors and patch pr
ovided by Roger Bouchard.
440 ' Tell BASIC new screen size

450 POKE&HFE00,&H20:POKE&HFE01,0
: ' beginning cursor address
460 POKE&HFE04,128: ' # columns
on text screen
470 POKE&HFE05,28: ' # rows on t
ext screen
480 POKE&HFE06,&H3E:POKE&HFE07,&
H00: ' End of text screen
490 ' ***  Patch BASIC's LOCATE
command  ***
500 POKE &HF90A,&H58: 'enable ne
w LOCATE positions
510 POKE &HF8EC,128:' Allows LOC
ATE from column 0 - 127
520 POKE &HF8F4,28: ' Allows LOC
ATE from row 0 - 27
530 CLS
540 ' Read DATA strings
550 FORX=1TO4:READ M$(X):NEXT
560 FORX=0 TO 21:READ A$(X):NEXT
570 FORX=1TO12:READB$(X):NEXT
580 ' Main program begin
590 ATTR 0,0:CLS
600 POKE 65497,0
610 POKE &HFF9F,128
620 F$="#####.##":T$="    ######
#.## "
630 FORY=0TO13:MO(Y,21)=0:NEXT
640 ATTR 1,3
650 FORX=1 TO 4
660 PRINT M$(X)
670 NEXT X
680 ATTR 2,1:PRINTA$(0):ATTR 2,3
690 PRINT
700 T=0:C=0
710 FORX=1 TO 20
720 A$(X)=LEFT$(A$(X)+STRING$(15
," "),15): ' Make sure string le
ngth is 15 chrs.
730 ATTR 2,3:PRINT" ";:ATTR 1,3
740 PRINT A$(X);
750 FORY=1 TO 12
760 T=T+MO(Y,X)
770 ATTR 0,3
780 PRINTUSING F$;MO(Y,X);
790 MO(Y,21)=MO(Y,21)+MO(Y,X)
800 NEXT Y
810 ATTR 1,3
820 MO(13,X)=T
830 MO(13,21)=MO(13,21)+T:PRINTU
SINGT$;T;:ATTR 2,3:PRINT" ";:T=0
840 NEXT X
850 ATTR 1,3
860 PRINT "                ";STR
ING$(110,"-")
870 PRINT" ";
880 ATTR 2,1
890 PRINTA$(21);:ATTR 1,3
900 FORX=1TO12
910 GOSUB 990
920 PRINTUSINGF$;MO(X,21);
930 NEXT
940 F$="#####.##"
950 ATTR 1,3
960 PRINTUSING T$;MO(13,21);:ATT
R 6,4:PRINT" ";
970 ATTR 2,3:PRINT:ATTR 1,3:GOTO
 1080
980 ' Check number and change US
ING string accordingly
990 IF MO(X,21)>9999 THEN F$="##
####.#" ELSE F$="#####.##"
1000 IF MO(X,21)>99999 THEN F$="
########"
1010 RETURN
1020 ' Main Menu
1030 ' scroll routine and check
for <F1> key or left & right arr
ow keys
1040 ATTR 1,3:LOCATE 0,0:FORX=1T
O4:PRINTM$(X):NEXT
1050 ATTR 2,1
1060 LOCATE 0,4:PRINTA$(0);
1070 ATTR 1,3
1080 X=128
1090 L=PEEK(343):' Check left ar
row
1100 R=PEEK(344):' Check right a
rrow
1110 I$=INKEY$
1120 IF I$="g" THEN 1320: 'Check
 for <F1> key
1130 IF R=247 THEN X=X-1:IF X<=1
28 THEN X=128
1140 IF L=247 THEN X=X+1:IF X>=1
76 THEN X=176
1150 POKE &HFF9F,X
1160 GOTO 1090
1170 POKE &HFF9F,128
1180 ATTR 0,0:CLS:PRINT:PRINT:PR
INT " * BREAK key pressed *":PRI
NT
1190 IF DEV=0 THEN RUN
1200 PRINT:PRINT "  Press <M> fo
r Main"
1210 PRINT "  Press <Q> to quit"
1220 I$=INKEY$
1230 IF I$="M" THEN 1820
1240 IF I$="Q" THEN 1260
1250 GOTO1220
1260 ATTR 0,0:CLS:WIDTH80:POKE65
496,0
1270 END : ' **** END ****
1280 POKE &HFF9F,128:CLS:PRINT:P
```

```
RINT:PRINT"  An ERROR has occurr
ed ! "
1290 PRINT:PRINT" Error number";
ERNO;"in line number";ERLIN
1300 PRINT:GOTO 1190
1310 ' *** Command mode ***
1320 POKE &HFF9F,128:X=1:Y=1
1330 ATTR 1,3
1340 T$="     #######.##"
1350 IF X>=8 THEN LOCATE 47,3 EL
SE LOCATE 0,3
1360 PRINT " (F)ile i/o     (M
)ain menu        (P)rint      a
rrow keys        (ALT)        ";
1370 A=MO(X,Y)
1380 IF X=>8 THEN LOCATE 0,0:ATT
R 1,3:PRINT:PRINT:LOCATE 64,0:GO
TO 1400
1390 ATTR 1,3:LOCATE 64,0:PRINT:
LOCATE 0,0
1400 PRINT "Column/Row = ( ";B$(
X);CHR$(44);A$(Y);")     Value =
 ";
1410 PRINT USING F$;A;
1420 PRINT:PRINT:PRINT
1430 ' locate on current cell
1440 LOCATE 8+(X*8),Y+5
1450 ATTR 4,2,U:PRINTUSINGF$;A;:
ATTR 2,3: ' Hi-lite current cell
1460 I$=INKEY$
1470 IF I$="" THEN 1460
1480 ATTR 1,3
1490 IF VAL(I$) > 0 THEN 1640
1500 IF I$="0" THEN 1640
1510 XX=X:YY=Y: ' save current c
ell location to allow erase of h
i-lite
1520 IF I$=CHR$(8) THEN X=X-1:IF
 X<1 THEN X=1: ' left arrow
1530 IF I$=CHR$(9) THEN X=X+1:IF
 X>12 THEN X=12: ' right arrow
1540 IF X<8 THEN POKE&HFF9F,128
ELSE POKE &HFF9F,192: ' shift wi
ndow
1550 IF I$=CHR$(10) THEN Y=Y+1:I
F Y>20 THEN Y=20: ' down arrow
1560 IF I$=CHR$(94) THEN Y=Y-1:I
F Y<1 THEN Y=1: ' up arrow
1570 ATTR 0,3:LOCATE 8+(XX*8),YY
+5:PRINTUSINGF$;A;:ATTR 2,3: ' e
rase hi-lite on previous cell
1580 IF I$="F" THEN 1830: ' File
 save or load
1590 IF I$="P" THEN 2240: ' Prin
ter out
1600 IF I$="M" THEN 1040: ' main
```

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–2/88 Rainbow review

"A definite 5 stars!"
–12/87 Wizard's Castle review

SCORE 550
TIME 173
STRENGTH

This appears to be a side window. The curtains are drawn and I can make out the figure of a man inside.

You see: WINDOW
EXITS: W

COMMAND? LOOK WINDOW

WHITE FIRE OF ETERNITY

64K Animated Graphic Adventure. See 12/86 Rainbow review. Only $19.95.

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```
 menu
 1610 IF I$="@" THEN 1320:' <ALT>
 or <@> key returns to upper lef
t cell
 1620 SOUND 180,1:' key click..
delete if annoying
 1630 GOTO 1330
 1640 IF X=>8 THEN LOCATE 64,1:PR
INT:LOCATE 64,1:GOTO 1660
 1650 LOCATE 0,1:PRINT:LOCATE 0,1
 1660 ATTR 1,3
 1670 T=MO(X,Y)
 1680 PRINT"  New value : ";I$;
 1690 LINEINPUT RM$
 1700 I$=I$+RM$:MO(X,Y)=VAL(I$)
 1710 IF MO(X,Y)>=10000 THEN MO(X
,Y)=T:SOUND 100,2:GOTO 1330
 1720 ATTR 1,3
 1730 MO(X,21)=0:MO(13,Y)=0:MO(13
,21)=0
 1740 FORV=1TO20:MO(X,21)=MO(X,21
)+MO(X,V):NEXT
 1750 GOSUB 990
 1760 LOCATE 8+(X*8),27:PRINTUSIN
GF$;MO(X,21);
 1770 FORV=1TO12:MO(13,Y)=MO(13,Y
)+MO(V,Y):MO(13,21)=MO(13,21)+MO
(V,21):NEXT
 1780 LOCATE 112,Y+5:PRINTUSINGT$
;MO(13,Y);
 1790 LOCATE 112,27:PRINTUSINGT$;
MO(13,21);
 1800 F$="#####.##"
 1810 GOTO 1330
 1820 GOTO 590
 1830 POKE &HFF9F,128:LOCATE 0,0:
ATTR 1,3
 1840 PRINT:PRINT:PRINT:PRINT:LOC
ATE 0,0
 1850 PRINT "  < FILE I/O >
  (S)ave   (L)oad  or  (Q)uit "
 1860 I$=INKEY$
 1870 IF I$="S" THEN LOCATE 0,0:P
RINT:GOTO 1920
 1880 IF I$="L" THEN LOCATE 0,0:P
RINT:GOTO 2080
 1890 IF I$="Q" THEN 1320: 'Retur
n to command mode
 1900 GOTO 1860
 1910 '*****        SAVE
 1920 LINEINPUT "  Filename to sa
ve : ";F$
 1930 IF LEN(F$)>8 THEN SOUND 100
,2:GOTO 1830
 1940 F$=F$+"/SUM"
 1950 POKE 65496,0
 1960 IF DEV=-1 THEN LINEINPUT "
 Prepare tape and press <ENTER> "
 ;I$
 1970 OPEN "O",DEV,F$
```

```
 1980 FOR Y=1TO20
 1990 PRINT#DEV,A$(Y)
 2000 FORX=1TO12
 2010 PRINT#DEV,MO(X,Y)
 2020 NEXT X
 2030 PRINT#DEV,"*******":' dummy
 string
 2040 NEXT Y
 2050 CLOSE
 2060 GOTO 1820
 2070 '*****          LOAD
 2080 LINEINPUT " Filename to lo
ad : ";F$
 2090 IF LEN(F$)>8 THEN SOUND 100
,2:GOTO 1830
 2100 F$=F$+"/SUM"
 2110 POKE 65496,0
 2120 IF DEV=-1 THEN LINEINPUT "
Prepare tape and press <ENTER> "
;I$
 2130 OPEN "I",DEV,F$
 2140 FORY=1TO20
 2150 INPUT#DEV,A$(Y)
 2160 FORX=1TO12
 2170 INPUT#DEV,MO(X,Y)
 2180 NEXT X
 2190 INPUT #DEV,I$:' ignore dumm
y string
 2200 NEXT Y
 2210 CLOSE
 2220 GOTO 1820
 2230 ' PRINTER OUT
 2240 POKE &HFF9F,128:LOCATE 0,0:
PRINT:LOCATE 0,0:ATTR 1,3
 2250 LINEINPUT " Prepare printer
 and press <ENTER> or <BREAK> to
 quit ";I$
 2260 POKE 65496,0
 2270 ' Q$=CHR$(27)+CHR$(20): ' F
OR RADIO SHACK PRINTER
 2280 Q$=CHR$(27)+CHR$(66)+CHR$(3
):' FOR GEMINI 10X
 2290 ' SET TO 17 CPI
 2300 PRINT#-2,Q$
 2310 PRINT#-2,RIGHT$(A$(0),124)
 2320 PRINT#-2,STRING$(128,95)
 2330 FORX=1TO21
 2340 IF X=21 THEN PRINT#-2,STRIN
G$(128,95)
 2350 PRINT#-2,A$(X);
 2360 FORY=1TO12
 2370 IF MO(Y,X)>9999.99 THEN F$=
"######.#" ELSE F$="#####.##"
 2380 IF MO(Y,X)>99999 THEN F$="
###### "
 2390 PRINT#-2,USING F$;MO(Y,X);
 2400 NEXT Y
 2410 PRINT#-2,USING T$;MO(13,X)
 2420 NEXT X
 2430 GOTO 1820
```

```
2440 '
2450 ' TEXT STRINGS
2460 '
2470 ' M$(1) -  M$(4)
2480 DATA ""
2490 DATA "
    -< Sum 128 >-"
2500 DATA ""
2510 DATA " Press left or right
arrow keys to scroll       Pres
s F1 key for command mode "
2520 ' A$ (0)
2530 DATA "     Item           J
an     Feb     Mar     Apr     M
ay     Jun     Jul     Aug     S
ep     Oct     Nov     Dec
    Total"
2540 '
2550 '
2560 ' Edit ->  Category 1  - C
ategory 20  to suit needs !
2570 ' The length of the string
must remain the same !   15 chrs
. min/max !
2580 '     A$(1)  -   A$(20)
2590 DATA "Catagory 1     "
2600 DATA "Category 2     "
2610 DATA "Category 3     "
2620 DATA "Category 4     "
2630 DATA "Category 5     "
2640 DATA "Category 6     "
2650 DATA "Category 7     "
2660 DATA "Category 8     "
2670 DATA "Category 9     "
2680 DATA "Category 10    "
2690 DATA "Category 11    "
2700 DATA "Category 12    "
2710 DATA "Category 13    "
2720 DATA "Category 14    "
2730 DATA "Category 15    "
2740 DATA "Category 16    "
2750 DATA "Category 17    "
2760 DATA "Category 18    "
2770 DATA "Category 19    "
2780 DATA "Category 20    "
2790 '
2800 ' A$ (21)
2810 DATA "  Total        "
2820 '
2830 ' B$(1) - B$(12)
2840 DATA Jan,Feb,Mar,Apr,May,Ju
n,Jul,Aug,Sep,Oct,Nov,Dec
2850 '
```

Listing 2: MONTEST

```
10 ' Montest
20 ' By Dave Archer
30 ' test monitor support for 12
8 (80 window) by 28 text screen
40 PALETTE 8,63:PALETTE 0,0 ' wh
ite text on black background
50 WIDTH80:CLS1
60 ON BRK GOTO 340
70 POKE&HFF98,&H03:POKE&HFF99,&H
75: ' Set for 28 rows of text
80 POKE&HFF9F,128: ' Set for 128
 columns with column 0 as left m
ost column
90 ' Tell BASIC new screen size
100 POKE&HFE00,&H20:POKE&HFE01,0
: ' beginning cursor address
110 POKE&HFE04,128: ' # columns
on text screen
120 POKE&HFE05,28: ' # rows on t
ext screen
130 POKE&HFE06,&H3E:POKE&HFE07,&
H00: ' End address of text scree
n
140 ' *** Patch BASIC's LOCATE
command ***
150 POKE &HF90A,&H58: 'enable ne
w LOCATE positions
160 POKE &HF8EC,128:' Allows LOC
ATE from column 0 - 127
170 POKE &HF8F4,28: ' Allows LOC
ATE from row 0 - 27
180 CLS
190 A$="<------      this is colum
ns 80 - 127      ------->x"
200 FORX=0 TO 27:LOCATE 79,X:PRI
NT"x";:LOCATE 127,X:PRINT"x";
210 LOCATE 0,X: PRINT " Line num
ber ";X;
220 NEXT
230 LOCATE 20,0:PRINTSTRING$(108
,"*");
240 LOCATE 20,27:PRINTSTRING$(10
8,"*");
250 LOCATE 80,13:PRINTA$;
260 LOCATE 20,23:PRINT "Press an
y key";
270 LOCATE 20,10:PRINT "This sho
ws columns 0 - 79 ";:LOCATE 0,27
280 ON BRK GOTO 310
290 I$=INKEY$:IF I$="" THEN 290
300 ' scrolls columns 80-127 int
o display window
310 FORX=128 TO 176:POKE &HFF9F,
X:FORD=1TO10:NEXTD:NEXTX
320 ON BRK GOTO 340
330 FORX=1TO2900:NEXT:'delay to
view
340 WIDTH80:'restore to normal 8
0 col. by 24 line screen
```

Bigger and Better Eproms

By Tony DiStefano
Rainbow Contributing Editor

A long time ago, when computers for the consumer were just starting to come on the market, large amounts of memory were unheard of. My first computer was a Sinclair ZX-80. It had only 1K of Random Access Memory, or RAM.

RAM is a temporary storage place for data — as long as the computer is on, RAM will remember what is put into it. When you first power up a computer, RAM has no set pattern. The data in it is not valid data. When you turn the computer off, all RAM data is lost.

Anyway, imagine only 1,024 bytes of memory, and half of that used for video display — a far cry from our present CoCos. BASIC was in Read-Only Memory, or ROM, and that was a whopping 4K ROM at that. Later, they came out with 8K of ROM, which was a big improvement.

ROM is memory that has been permanently etched into the chip at the factory. It cannot be changed or lost. When you power up with ROM, instant data (or a program) appears. Every computer needs a bit of ROM (no pun intended). How much is a "bit"? Well, that all depends on what that ROM has to do.

When a computer is first powered up, a hardware reset line delays the start of the CPU until the power supply is stable. Then, when the reset line lets go, the first thing the CPU does is load a starting address from a predetermined area of memory. It loads this address into its program counter and then starts to execute the code pointed to by this program counter. Now, what is wrong with this picture? If this area of memory is RAM, we're in trouble. On power-up, RAM has no definite pattern; the CPU would certainly get confused and hang up. But if ROM were there in place of RAM, then the CPU would see valid code and run merrily on its way. Hurray for ROM!

ROM is great — instant software, and no way to lose it. But for hackers like you and me, ROM is a downer. Why? For the same reason that makes ROM great — it locks us in. It cannot be changed. The code that is in a ROM is for keeps.

The manufacturer of ROMs saw a need for the user to be able to program his or her own ROM. From that need came the PROM. The PROM is a Programmable ROM. In other words, a PROM is a blank ROM. A special device lets you program your own data code into the PROM. That was great, but if you made an error in your code, you had to throw that chip away and start with a new one. The chip was fine for small runs of a proven code: It had all the advantages of ROM and none of the high costs of mask programming a ROM.

But there remained a need for a reusable chip that was easy to program. The EPROM was introduced — an erasable PROM. Just what the doctor ordered. Easy to use, inexpensive and able to be used over and over again. When I first started learning about computers, I wanted to customize mine. When I turned it on, I wanted it to say "HI TONY." It was that desire that made me want to learn more about EPROMs.

Back then, the most capacious EPROM I could find was only a 2K by 8-bit EPROM. Its part number was 2716. The "16" represents the number of bits in that chip. There are 16K (16 thousand) bits. Most microprocessors then were only eight bits wide, so EPROMs were also eight bits wide. Dividing 16,000 bits into 8-bit-wide bytes gave us 2K (2,000) bytes of memory. But that was then, and this is now. As technology improved, so did EPROM capacities. After the 2716 came the 2732. Yes, you guessed it, the 2732 has 32K bits or 4K by 8 bits — twice the capacity of the 2716.

Still improving, technology then allowed for a reasonably priced 2764. To me that was the breakthrough, a 64K bit EPROM and 8K to play with. This was great because it was the same size as the BASIC, Extended BASIC and the Disk BASIC ROMs to EPROMs. I was able to customize these ROMs with EPROMs.

Things didn't stop there. The prices for these EPROMs started very high, but soon dropped very fast. Again, the industry came out with another EPROM — another doubling of capacity. Yes, a 27128, a whole 16K of data in one chip. Impressive as it was, it did not stop there. Next came the 27256 and then the 27512. The 27256 is a 32K EPROM and the 27512 is a 64K EPROM. Just think of it. The 6809 CPU inside the CoCo can access 64K of memory — that is the whole 6809's memory address in one chip! If you think back to the 2716, it would take 32 of these memory chips to make up the capacity of one 27512. I know that manufacturers are making 231024s, which are 128K by 8-bit ROMs (but I don't think they have them in EPROMs — just yet, anyway).

The Project

What can you do with these bigger and better EPROMs? Well, I have a few ideas. The easiest place to put EPROMs

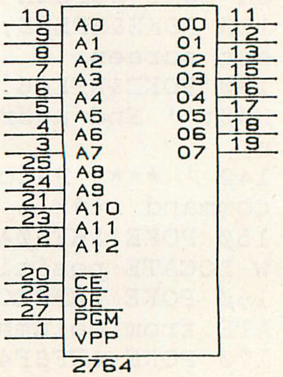

Figure 1

Tony DiStefano is a well-known early specialist in computer hardware projects. He lives in Laval Ouest, Quebec.

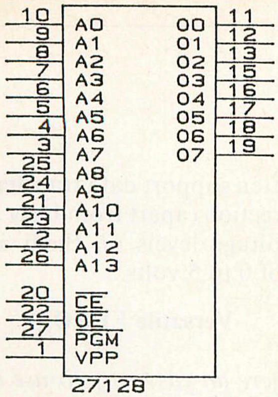

Figure 2

is in the Multi-Pak. And the easiest place to map them is in the Disk BASIC area, located from $C000 to $FEFF in the memory map of the CoCo 1 and CoCo 2. With the CoCo 3, you are a little bit more limited. The mapping is from $C000 to $FDFF, just one page less only 256 bytes at the top of the memory map. That is to accommodate the extra functions of the GIME chip. Anyway, for all intents and purposes, this area is 16K long. Just remember the top two pages are not usable.

Look at Figure 1, a pinout of a 2764. I started there because I figure it is the smallest memory chip (8K long) that is worthwhile hooking up. Accessing this amount of memory requires 13 address lines, A0 to A12. The CTS pin on the CoCo's bus accesses a total of 16K, requiring 14 address lines to properly decode. This leaves us with one address line left over. In this case, we can't use it. Leave it unconnected. This will cause a memory mirror. If the CPU accesses the first half of the 16K memory area, it gets the data. When it accesses the second half of the memory, it gets the same data. The only difference is that the last address line, A13, does not control anything. Such is the case of the Disk BASIC ROM in the Radio Shack Controller; it is only 8K long and is mirrored to the second half of the 16K area.

Now look at Figure 2, the pinout of a 27128. It has 14 address lines, making it 16K long. It is a perfect match for the CTS area of the CoCo. There are no leftover address lines. The CPU can access a full 16K of memory with no memory mirroring.

Figure 3 shows the pinout for a 27256. This one has one more address line than we can handle. That is the number of address lines it requires to access 32K. This presents a problem. The CTS cannot handle 32K, and we have one address line left over, with nowhere to connect. Figure 4 is the pinout of a 27512. It has double the problem, with yet another address line we don't know what to do with.

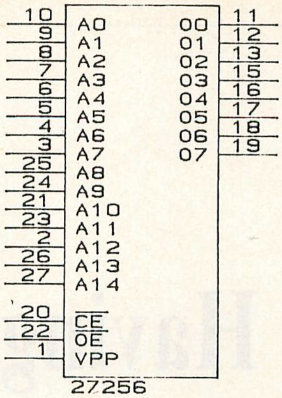

Figure 3

The 27256 represents 32K of data, but that is just one way of looking at it. Another way of looking at it is as two banks of 16K. For example, let's say you have two pieces of software that are each 16K long. You can put both of them on one 27256 and select which you want to use when you turn on the computer. This can be done quite simply.

Figure 5 shows a small (I mean *small*!) circuit that can select between the two banks of a 27256. It consists of a single pole, single throw switch and a resistor. The resistor acts as a "Pull Up." When the switch is in the off position, current is fed from the 5-volt supply to the address line via this resistor. The XX means whichever address line is connected to it, making the address line a logic level of 1, or HI. When the switch is on, the current is shorted to ground, making the address line in question a logic level of 0, or LO. The switch and resistor become your manual bank selector. When this circuit is connected to A14 on a 27256 and the switch is on, you get the first half of the EPROM. When the switch is off you get the second half. So, when you turn the computer on, it will see one or the other. If you happen to turn the switch when the computer is on, chances are the computer will get confused and hang up. However, this does not hurt the computer.

If you are thinking of using a 27512, you can have four banks of software, each bank 16K long. In that case, you have to build another circuit like the one in Figure 5. Connect the second switch to A15. When both switches are on, you get the first 16K bank of software. When the A14 switch is off and the A15 switch is on, you get the second. When the A14 switch is on and the A15 switch is off, you get the third bank. When both switches are off, you get the last bank of software.

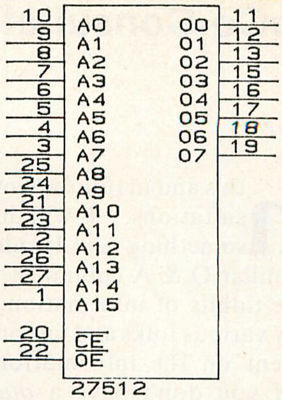

Figure 4

So far, the switches have been switching 16K banks of data. If most of your software is in 8K blocks or less, you might want to switch these EPROMs in 8K banks instead of 16K banks. You will need yet another circuit like the one in Figure 5.

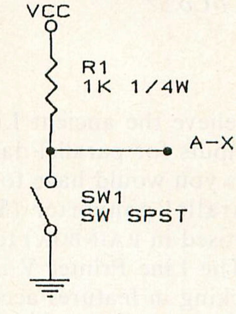

Figure 5

In either the 27128, 27256 or the 27512, disconnect A13 from the computer side. Connect A13 to the third switch. This switch now controls 8K banks. When the switch is off, you are seeing the first, or lower, 8K bank of data at $C000 to $DFFF. When this switch is on, you see the second, or upper, bank also mapped at $C000 to $DFFF. When you use a 27128, you get two 8K banks. A 27256 gets you four banks, and a 27512 gives you a whopping eight 8K banks of software. Remember, though, that each one of these banks starts at memory location $C000 and that for this software to work properly, they must be written for this area or be in complete relocatable code. Also remember that to autostart software that begins at $C000 you must short out Pin 7 and Pin 8 on the CoCo bus. Software that looks like a DOS must have the first two bytes the same as RS-DOS in order to function properly and be recognized by BASIC. DOS-like software must not have pins 7 and 8 shorted.

Having Technical Difficulties?

By Marty Goodman
Rainbow Contributing Editor

In this and in future "CoCo Consultations," I will be trying something new. In addition to the familiar Q & A column, I will also include tidbits of information contributed by various folks and, in some cases, comment on the information. Thus, even if you don't have a *question*, I invite you to send in any little hints or descriptions of experiences you have had with the CoCo that you think might be of interest to the CoCo-owning public in general.

Old Printers Should Retire

How can I hook up a Line Printer V (currently used on a TRS 80 Model 2) to a CoCo 2?

Jeff Causley
Bay City, MI

I believe the ancient Line Printer V has inputs for parallel data only. That means you would have to buy a serial-to-parallel converter ($50 to $110, advertised in RAINBOW) to get it working. The Line Printer V is so old, and so lacking in features accessible to the CoCo, that I would recommend not even bothering to try this (unless you can get such a converter for free). Instead, spend the $110, plus $70 more, on a more modern printer.

No Power to Spare

I need about an extra amp of power to run a Cir-pak 68008 board on my CoCo 3. How can I modify the CoCo 3 power supply to provide this? I've already replaced some of the TTL chips on the 68008 board with HCT-type chips, but I still need at least .6 amp more power than the CoCo 3 can provide. Also, I note that TS Edit *does not work with OS-9 Level II. Can you help with that?*

Doublas Streidt
Stillwater, OK

Do *not* under *any* circumstances attempt to power such a board from the CoCo 3! Instead, run it off a separate power supply. The CoCo 3 has *no* power to spare for such jobs. There are patches on the Delphi OS-9 Online SIG to allow using *TS Edit* under OS-9 Level II.

Parallel Port Communications

Can I use the Disto Parallel Port to talk to my modem?

Brandon Knight
(KNIGHT1)
Sulphur, OK

No. Essentially, all external modems communicate with the computer via an RS-232 serial protocol, not a parallel protocol. The differences between RS-232 serial and parallel port protocols are considerable. RS-232 serial lines use two wires plus ground to send data both to and from the computer, plus one or more handshake lines. The voltages on the serial lines vary between +12 and -12 volts. Parallel lines consist of at least eight data lines plus a strobe and one or more handshake lines. Parallel lines often support data transfer in only one direction (apart from busy signals). The voltage levels on them are TTL levels of 0 to 5 volts.

Versatile EPROM

Is there an easy way to use a 28-pin 2764 EPROM in a Radio Shack disk controller that takes a 24-pin ROM?

Mike Tolbert
(MIKEGT)

A long time ago, Dennis Kitsz, of Green Mountain Micro, designed an adapter to do just that. For a while, it was sold by Spectrum Projects. When Dennis disappeared from the CoCo world, his adapter disappeared also. Recently, however, a friend of Art Flexser developed an even better, cleaner, more clever adapter to do exactly what you ask. This item is currently available from SpectroSystems. It allows you to use either a 2764 or a 27128 EPROM in your Radio Shack controller.

64K Upgrades

Can I upgrade my cassette tape-based CoCo 2 to 64K, 128K or higher without getting a disk drive system?

Rob Casebolt
Aurora, MO

If you have a 16K CoCo 2, it is easy to upgrade to 64K. Kits for doing this are available from many folks who advertise in RAINBOW. If your CoCo already has more than 16K of memory in it, you already have a 64K CoCo. There are kits for adding extra memory to the CoCo 2 (J&R makes one such, called the Banker, and Disto makes another, called the Super Ram Disk) but, unless you have a particular application for them, they are not of much value because the only programs that can make good use of them are those that use disk I/O frequently. For nearly all practical purposes, 64K is the memory limit of the CoCo 2. If you need more power and flexibility, the next thing to spend money on would, without question, *not* be more memory, but rather a disk drive system. After that, if you still need more power, it might be wise to get a CoCo 3 before experimenting with add-on RAM disk cards.

Martin H. Goodman, M.D., a physician trained in anesthesiology, is a longtime electronics tinkerer and outspoken commentator — sort of the Howard Cosell of the CoCo world. On Delphi, Marty is the SIGop of RAINBOW's CoCo SIG and database manager of OS-9 Online. His non-computer passions include running, mountaineering and outdoor photography. Marty lives in San Pablo, California.

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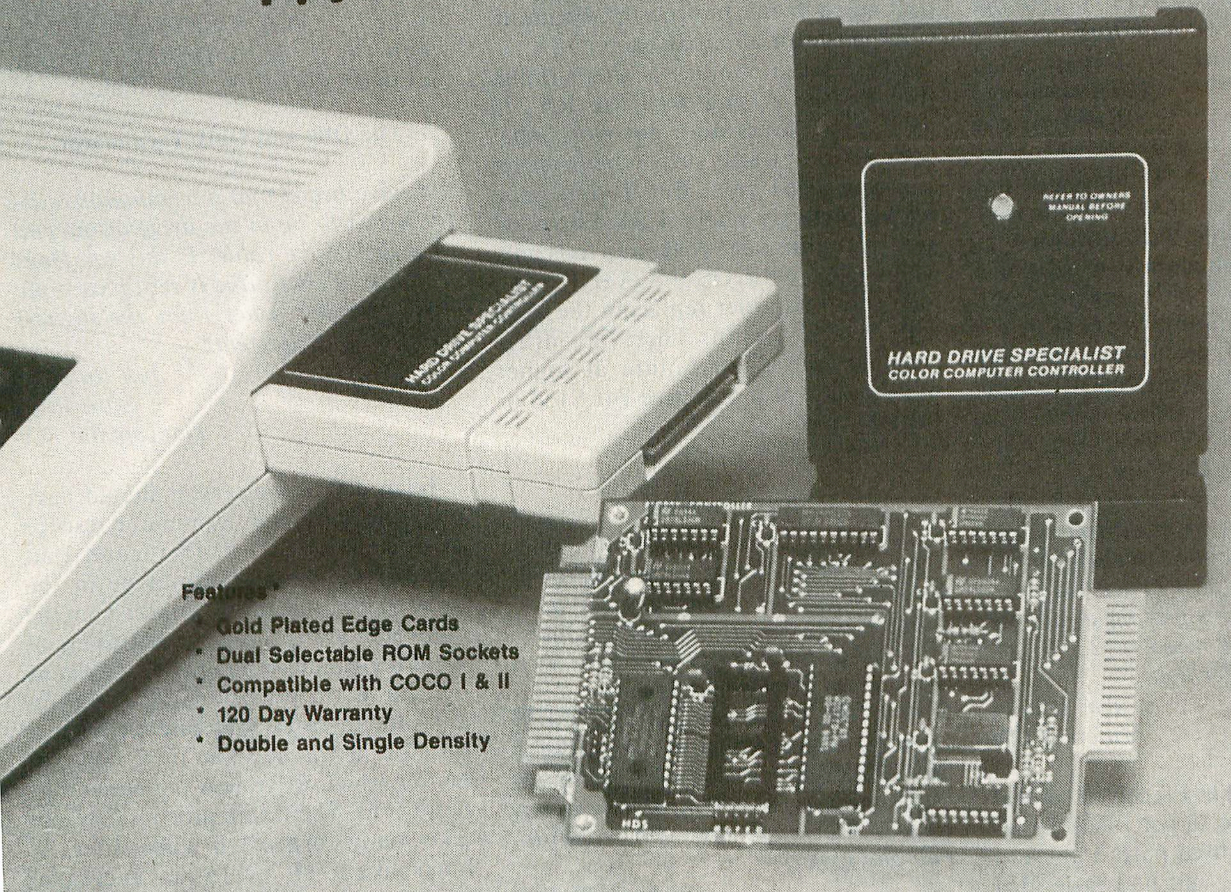
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Foiled Again

Marty, you once mentioned to me that there are problems of one monitor interfering with another when the two are placed side by side. I had the same problem, and was successful in eliminating it by placing a piece of aluminum foil between the two monitors.

Dennis Skala
(DENNYSKALA)
Fairview, PA

Thanks very much, Dennis, for that tip. I am delighted that such an easy solution is available. I do note that as the amount of shielding in different brands of monitors varies *greatly*, your suggestion might not work with all combinations of monitors, but still should be tried first by anyone with such a problem.

Getting the Part

I've been trying to build that surge protector you described in the October 1986 issue of RAINBOW (Page 158), but am having problems getting a dual or single Zener diode rated at 220 volts. Where might I order them?

Tim Wright
Minerva, OH

I must confess that I received several notes asking where to get those Zener diodes. Frankly, I used parts I got at a local surplus store, and had little idea where one ordinarily gets them. But it turns out that a single direction 200-volt 10-watt Zener is available as a Sylvania ECG series replacement component: Sylvania Part No. ECG 5232A. You'll need to put two of them together, cathode to cathode, to make the dual Zener arrangement I described. The part is relatively expensive (as are all ECG series parts), but should be available at most stores that sell TV repair parts.

RS-232 Pack Failure Under OS-9

I notice that the 6551 chip in the RS-232 pack is rated at 1 MHz operation. Is it possible that this could cause problems when one attempts to use the RS-232 pack under OS-9 Level II, which runs the CoCo at 2 MHz cycle speed?

James McDaniel
(NEWKID)
Brooklyn, NY

I myself have not heard of any problems due to "slow" 6551 chips, but Greg Law (GREGL), SysOp of our OS-9 Online SIG, tells me he has heard occasional reports of RS-232 packs not working under OS-9 Level II, and of the problem being cured by replacing the 6551 chip with a 6551A chip (rated for 2 MHz operation). Such chips can be purchased from Jameco, of Belmont, California, for about $6 each.

There are a number of *other* things that can go wrong with the RS-232 pack, so if yours does not work, that does not necessarily *prove* the problem is a slow 6551 chip. But if your pack works perfectly under Disk Extended BASIC programs at 1 MHz and fails only when used with OS-9 Level II, you might well consider replacing the 6551 with a 6551A chip. There are other possible causes for failure at higher speeds, such as a defective 74LS133 or 74LS04 chip.

Bad Contacts

I have been having increasing problems that appear to be caused by poor contacts between my Multi-Pak and my disk controller. These problems were cured when I switched my controller to Slot 4 (the recommended slot for it, anyway). I'm curious, though: Why is Slot 4 recommended, and could the problems be related to my failure to buy a new PAL chip for use with my Multi-Pak and CoCo 3?

Richard Phillips
(RHP)
Snyder, NY

Sometimes the problems of bad contacts between CoCo and Multi-Pak, and Multi-Pak and the disk controller are cured merely by cleaning the edge card connector with a pencil eraser. These problems can occur *even* with disk controllers that have gold-plated contacts, though the gold *does* help considerably.

Sometimes the fix is considerably more difficult, for it will involve replacing the *female* edge card connector on the CoCo or the Multi-Pak. This can be quite tedious. Slot 4 is allocated for the disk controller by convention. For *most* Disk Extended BASIC programs, it does not matter where you put the controller in the Multi-Pak. But when you start to use OS-9 and programs that utilize the CART interrupt line, it will be important to observe the conventions about where things go in the Multi-Pak.

By convention, the RS-232 pack usually goes in Slot 1 of the Multi-Pak. *MikeyTerm*, *Greg-E-Term* and *Rickyterm* do *not* care where you put the disk controller or RS-232 pack, but OS-9 terminal software will most likely care a lot. I doubt the PAL chip was the source of your problem, but it is true that one symptom of a bad PAL chip can be that Disk BASIC boots up only when the disk controller is in one particular slot of the Multi-Pak.

The One and Only Terminator

I have heard that a terminator resistor needs to be in the drive at the end of a disk drive cable. Is this so? Does it matter if that drive is set up as some drive number other than the highest number in the system?

Jon Ruhnow
(RUHNOW)
Duncanville, TX

Each disk drive system should have one, and only one, terminator resistor in one of its drives. In theory, that terminator resistor should be in the drive that physically is farthest from the controller along the cable, regardless of what logical drive number that drive is defined as. In practice, as long as you are sure there is only *one* terminator resistor in the system, it should not matter which drive you put the terminator into. The terminator resistor can take many forms: On some drives it looks like a 14- or 16-pin integrated circuit, and on others it is a blob of epoxy with a single row of pins. On a few more recent drives (such as the Teac 54A), the terminator resistor is permanently soldered into the drive. But the manufacturers use a 1,000-ohm terminator in such drives (instead of the 150-ohm removable terminators), so with these you can have another drive in the system with a terminator of the same value.

Your technical questions are welcomed. Please address them to CoCo Consultations, THE RAINBOW, P.O. Box 385, Prospect, KY 40059.

We reserve the right to publish only questions of general interest and to edit for brevity and clarity. Due to the large volume of mail we receive, we are unable to answer letters individually.

Questions can also be sent to Marty through the Delphi CoCo SIG. From the CoCo SIG> prompt, pick Rainbow Magazine Services, then, at the RAINBOW> prompt, type `ASK` (for Ask the Experts) to arrive at the EXPERTS> prompt, where you can select the "CoCo Consultations" online form which has complete instructions.

Sugar Software

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CALLIGRAPHER

CoCo Calligrapher - (Hybrid BASIC/ML) Turn your CoCo and dot-matrix printer into a calligrapher's quill. Make beautiful invitations, flyers, certificates, labels and more. Includes 3 fonts: *Gay Nineties, Old English* and *Cartoon*. The letters are ½ inch high and variably spaced. Works with many printers including Epson, Gemini, Radio Shack, Okidata 92A, Banana and Prowriter. Additional fonts are available (see below). Tape/Disk; **$24.95**.

OS9 Calligrapher - (C) Although a different program from the CoCo Calligrapher, the OS9 Calligrapher prints all the *same* fonts. It reads a standard text file which contains text and formatting directives. You may specify the font to use, change fonts at any time, centering, left, right or full justification, line fill, margin, line width, page size, page break and indentation. Similar to *troff* on UNIX™ systems. Includes Gay Nineties, Old English and Cartoon fonts. Additional fonts are available (see below). Disk only; OS9 Level I or II; **$24.95**.

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Economy Font Packages on disk; specify RSDOS or OS9; **29.95**: **Font Package #1** - Above font sets 1, 2 and 3 (25 fonts) on one disk. **Font Package #2** - Above font sets 4, 5 and 6 (26 fonts) on one disk. Both Packages #1 and #2 (51 fonts) on one disk; **49.95**.

Calligrapher Combo Package - *Everything!*; specify RSDOS or OS9; Includes the Calligrapher and both Font Packages on two disks; **$69.95**.

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Piratector - (100%ML) Utility to allow your own *disk-based* BASIC or ML programs to display a graphics title screen and then self-start after loading. Adds copy protection to your programs but still allows users to create *non-executable* backups! Includes Semigraf. Disk only; CoCo 1, 2, 3 (except Semigraf); **$39.95**.

Super Screen Machine - (100% ML) Put your CoCo into high resolution mode for your own BASIC or ML programs. Smooth scroll, key click, lower case with colored characters. Tape/Disk; 32K CB; CoCo 1, 2, 3 (except 64K mode); **$19.95**.

Color Disk Manager - (100%ML) Disk utility with these features: Disk repair, selective track initialization, verify sectors, backups, tape to disk transfer, ROM Pak execution from disk, much more! Tape/Disk; CoCo 1, 2, 3 (except for 64K mode); **$24.95**.

Color Tape Manager - (100% ML) Tape utility with these features: display start, end and exec address of ML programs, convert ML programs into *DATA* statements, append ML to BASIC, much more! Tape/Disk; 16K ECB; CoCo 1, 2, 3 (except for 64K mode); **$19.95**.

OS9 Patcher - (C) Display and modify the contents of a file or memory module. Hexidecimal, decimal and ASCII modes. Search feature. Calculates module CRCs; Generates patch command files. Disk only; OS9 Level I or II; **$19.95**.

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TIMS (The Information Management System) - (Hybrid BASIC/ML) Tape or disk, fast and simple general data base program. Create *files* of *records* that can be quickly sorted, searched, deleted and updated. Powerful printer formatting. Up to 8 *user* fields, sort on up to 3 fields. Tape/Disk; **$19.95** (see combo pkg below).

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TIMS Utility - (Hybrid BASIC/ML) Utility companion for TIMS and TIMS Mail to allow multi-term search (*AND* and *OR* logic), global change and delete, split large files and more! Tape/Disk; **$14.95** (see combo pkg below).

TIMS Combo Package - All three of the above programs: TIMS, TIMS Mail and TIMS Utility on one disk - **$34.95**.

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Bible Stories Adventure - (Hybrid BASIC/ML) Ages 4 & up. A graphics adventure game for young children & their families. Old testament. Tape/Disk; **$19.95**.

The Presidents of the USA - (100% ML) Ages 10 and up. Two trivia games, user modifiable, printer output supported. Tape/Disk; 16K ECB; **$19.95**.

The Great USA - Ages 9 and up. Trivia game of the 50 states. Capitals, nicknames, abbreviations, flowers, trees and birds. Tape/Disk; 16K ECB; **$19.95**.

Galactic Hangman - Ages 7 and up. Exciting new twist to the popular word game. Outstanding graphics; 700 word vocabulary. Tape/Disk; 16K ECB; **$19.95**.

PreReader - (Hybrid BASIC/ML) Ages 3-5 (level 1); Ages 5-7 (level 2); Great graphics and music. Level 1: match colors, shapes, letters and numbers; Level 2: match letters and consonant blends with their sounds. Tape/Disk; Joystick; **$19.95**.

Statgraf - High school and college level; Linear regression analysis program combined with a plotting and line graphing system. Up to 250 x/y pairs; data transformation; residuals; regression line; print graph with screen print program (not supplied); Tape/Disk; **$19.95**.

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CoCo Knitter - Easy to use program to display or print instructions to knit a sweater: Cardigan or Pullover; Round or V-neck; Raglan or Set-in Sleeve; 3 weights or yarn; 8 sizes from baby to man. Tape/Disk; **$19.95**.

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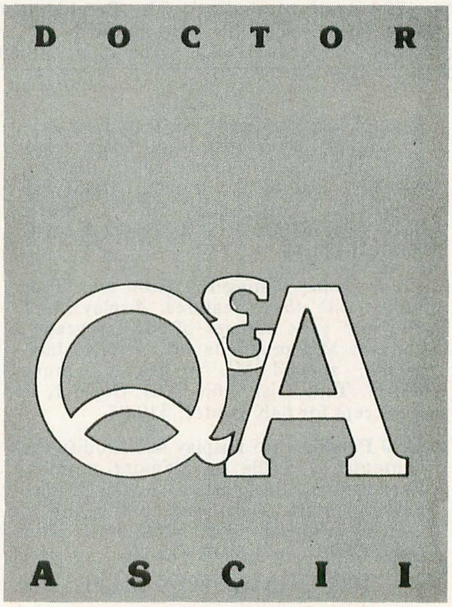
All programs run on the CoCo 1, 2 and 3, 32K Extended Basic, unless otherwise noted. Add $1.50 per tape or disk for shipping and handling. Florida residents add 6% sales tax. COD orders add $5. Dealer inquiries invited. Orders generally shipped in 24-48 hours. No refunds or exchanges without prior authorization.

Doctor ASCII



By Richard E. Esposito
Rainbow Contributing Editor
with Richard W. Libra

VIP CoCo 3 Fix

How can I fix VIP *software, such as* VIP Writer, *to run on the CoCo 3?*

Steve C. Munsell
Hermiston, OR

℞ To fix *VIP* software to run on the CoCo 3, you generally change the sequence of bytes $8C $FF $00 to $8C $FE $00.

80-Track or Hard Drive Dilemma

I have a CoCo 3 with 512K and OS-9 Level II, and I want to upgrade my disk drives to DSDD. Should I get 40- or 80-track drives, and who makes good ones? I also want a clock/calendar and a good type-ahead controller that I could attach a hard drive to. Also, I just bought the Avatex 2400 baud modem. At 2400 or 1200 baud, I can't get my printer to print right. Can I print while online at any speed?

Lawrence Myers
Silver Spring, MD

℞ A while ago, I would have said to go with 80-track floppies for OS-9, but with hard disk systems under $450 now, it makes little sense to upgrade your floppies. For example, I recently purchased an older white Multi-Pak for $20, a Burke & Burke (312-397-2898) CoCoXT-RTC hard disk interface for $99, a Hard Times (408-280-1969) Case and 65-watt Power Supply for $72, and a 20Mb Seagate ST225 Kit (includes cables and IBM PC/XT compatible Western Digital controller) for $269. The 10Mb drives are even cheaper.

If you still want floppies, consider the Teac 55F, an 80-track drive. On the newer drives, you can add a switch to toggle reading both 80- and 35/40-track drives under RS BASIC. The only problem with this setup is that normal 40-track drives may not reliably read a 40-track disk prepared in this fashion. For floppies, the Sardis (604-255-4485) "No Halt" controller for $150 has been lauded on Delphi. The latest CoCo drive, FD-502, is really a 40-track DSDD drive.

For your printing problem, you need to match the printer's baud rate and number of bits with the baud rate and number of bits coming from your telecommunications program.

A One-to-One Ratio

Is there a way to switch one disk drive between two computers when both of them are powered up? I have a CoCo 1 and 2 and only one drive.

Lowell James Welchman
Mountain View, WY

℞ Because of the expense of the multiple-gang switch required, it really wouldn't be practical.

BBSs: Disk Drives Required

I have a 64K CoCo 2 with Extended BASIC *and a tape player. I'm trying to put up a BBS, but I can't find any programs to let my computer talk to my modem in* BASIC. *How do I do this?* CoTerm *won't load!*

Christian J. Miller
Macedon, NY

℞ There was an excellent BBS by Michael Jorgenson in the November '87 issue of RAINBOW, but it, like all BBS programs, requires a disk drive. The reason for this is to provide for upload/download capability. The problem with a tape-based system is that you would have to manually switch between Record and Play and rewind the tape, which defeats the purpose of an automatic, unattended BBS.

Tape-Based Communications

Are there any tape-based communications programs for the CoCo using the RS-232 Deluxe Program Pak?

Luis A. Modesto
Miami, FL

℞ *MikeyTerm* is available for $10 from Michael D. Ward, 1807 Cortez, Coral Gables, FL 33134. Specify that you want the tape version.

Pak-to-Disk Transfers for New Cartridges

I've been a faithful reader of your column since its early days in HOT CoCo. *I've been using your* RomFix *program to put my old cartridges on disk, and in your September 1984 column you published patches for packs that did not work properly in the all-RAM mode. I was just wondering if you know the patches for the newer packs, particularly* Stellar Lifeline, Downland, Demon Attack *and* Dragon Fire. *The older patches came in quite handy and I'm hoping you can bring the list up-to-date.*

Paul Riddle
Linthicum, MD

℞ The original *RomFix* program was updated by David Dawson in the December '87 RAINBOW, Page 152. Add the appropriate line below to the `PAKXFER` program. The patches I have

---

Richard Esposito is a senior project engineer with Northrop Corp. He holds bachelor's, master's and doctorate degrees from Polytechnic Institute of Brooklyn. He has been writing about microcomputers since 1980.

Richard Libra is a simulator test operator for Singer Link Simulation Systems Division.

Education Breakthrough

New interactive CoCo software makes learning easy, fun. Kids love it!

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NEW LOW PRICE – 16 lessons for the price of 8! Educational Software for kids from 6 to 18.

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The Compass Education Software LOOK/LISTEN/LEARN approach is the next best thing to a private tutor. Unlike other educational software the Compass Library also *talks* to the student — not in synthesized speech, but in a real human voice. With on-screen textual information and attention-getting graphics, students of all ages actually enjoy learning!

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The lessons advance only after the student has correctly answered the questions throughout the programs assuring that the material has been thoroughly absorbed.

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All you need is the TRS-80* Color Computer (any model), computer cassette recorder and TV set. Once the cassette is loaded you need only enter two simple commands . . . and then press any key to start the lesson.

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To answer questions throughout the lesson simply press the appropriate number on the computer keyboard, type in the correct answer, or follow other easy instructions. And to go back and review, just rewind the cassette. It's that simple.

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There is not sufficient space in this advertisement to list all lesson titles, but here is a sample:

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In today's advanced, HiTech world, understanding and working with numbers is essential. Compass has developed three comprehensive series of math programs. From basic numerals for the very young, to algebra and higher mathematics for the older child. In between, there are programs for everything from addition and subtraction to practical everyday percentage problems.

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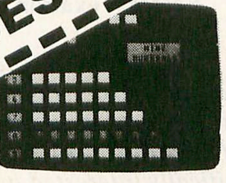

① MATH/FRACTIONS

Grades 4 to 8

- MF 1 — Numerator, denominator, bar
- MF 2 — Multiplication of fractions
- MF 3 — Factors and prime numbers
- MF 4 — Reducing fractions, reciprocals
- MF 5 — Reducing fractions, lowest terms
- MF 6 — Proper fractions, mixed numbers
- MF 7 — Multiplication-division of fractions
- MF 8 — Addition-subtraction of fractions
- MF 9 — Addition of mixed numbers
- MF 10 — Changing fractions to decimals
- MF 11 — Converting decimal numbers
- MF 12 — Word problems using percents
- MF 13 — Additional problems using percents
- MF 14 — Word problems using percents
- MF 15 — Finding circle area using pi
- MF 16 — Using a ruler to measure fractions

② MATH/BASIC ALGEBRA

For all grades

Sixteen lessons: MBA-1 to 16

③ MATH/NUMBERS

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Writing effectively means communicationg effectively. Through the writing series of lesson students of all ages will develop basic skills needed to turn thoughts and ideas into expressive words and phrases.

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A practical education begins with good reading skills and is continued with increased vocabulary comprehension and, of course, spelling. Your child will learn that reading is fun while they are also learning when to use "to," "too," and "two," and how to spell when building a vocabulary.

⑤ THE MAGIC OF SPELLING

Grades 4 to 8

- MS 1 — Plurals: branches, rodeos, valleys
- MS 2 — Plurals: houses, brushes, candies
- MS 3 — Plurals: babies, pianos, leaves
- MS 4 — Suffixes: boxed, referred, writing
- MS 5 — Suffixes: paid, quickly, extremely
- MS 6 — Suffixes: said, confusion, school's
- MS 7 — Homonyms: two, too, to; their, there
- MS 8 — Homonyms: our, are, hour; ate, eight
- MS 9 — Homonyms: weight, wait; who's, whose
- MS 10 – Homonyms: scent, cent; sell, cell
- MS 11 – Homonyms: dew, due; course, coarse
- MS 12 – Homonyms: cite, site, sight; by, buy
- MS 13 – Homonyms: blue, blew, creek, creak
- MS 14 – Homonyms: sale, sail; steel, steal
- MS 15 – Spelling by Syllables: letter, color
- MS 16 – Doubling Consonant Letters: hollow

⑥ VOCABULARY COMPREHENSION

Grades 3 to 5

Sixteen lessons: VC-1 to 16

⑦ READING COMPREHENSION

For all grades

Sixteen lessons: DRC-1 to 16

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To order, send your check or money order for **$49.95** (CA residents add sales tax) for each subject you wish, plus **$3.50** shipping and handling (any quantity). For immediate shipment, call collect the number below and charge your VISA or MASTERCARD.

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for problem RomPaks are the following:

Canyon Climber

```
235 POKE &H4424,&H12: POKE
&H4425,&H12
```

Colorterm

```
235 POKE &H404A,&H12: POKE
&H404B,&H12: POKE &H404C,
&H12: POKE &H4139,&H11
```

Cyrus

```
235 FOR I=&H484E TO &H4851:
POKE I,&H12: NEXT I
```

Demon Attack

```
235 FOR I=&H4027 TO &H402F:
POKE I,&H12: NEXT I
```

Dragon Fire

```
235 FOR I=&H401A TO &H4021:
POKE I,&H12: NEXT I: POKE
&H41B0,&H70
```

Megabug

```
235 POKE &H567D,&H12: POKE
&H567E,&H12: POKE &H567F,
&H12:POKE &H5680,&H12
```

Micropainter

```
235 POKE &H4067,&H3E: POKE
&H4068,&H80
```

Microbes

```
235 POKE &H45BB,&H12: POKE
&H45BC,&H12
```

Reactoids

```
235 POKE &H4C09,&H39
```

Slay the Nerius

```
235 POKE &H5124,&H12: POKE
&H5125,&H12
```

Spectaculator (original release)

```
235 POKE &H519F,&H8E: POKE
&H51A0,&H9F: POKE &H51A1,
&HFE:POKE &H51A2,&HBF: POKE
&H51A3,&H00: POKE &H51A4,
&H60:POKE&H51A9,&H39
```

Stats, Analysis Programs Under FORTRAN

I have been looking for a reasonably priced statistical package for my CoCo 3 that will do a few ANOVAs, Pearson correlations, rank difference correlations, t-tests, etc. I am aware of Lig-Pack, *but seven disks and about $150 are a bit much. What about the analyses performed by* CoCo-Stat *included with* The Rainbow Introductory Guide to Statistics*?*

Roger Page
Elida, OH

℞ Check your local library for a copy of *The Funstat Package In FORTRAN IV* by John T. Roscoe, published by Holt, Rinehart, & Winston, 1973. It contains FORTRAN program listings for the statistical techniques you desire, which, with minimal effort, can be modified to run on a CoCo in BASIC or BASIC09. *The Rainbow Introductory Guide to Statistics* describes some of the tests you mention.

Vector Vexation

When I plug in the disk controller, some of the pokes that work fine without it stop working. Why? Does Disk BASIC rearrange the memory map? I am specifically interested in the "slow speed scroll" poke, POKE 359,60.

Paul R. Rondeau
Lowell, MA

℞ The slow speed poke that you identified is an ingenious little shortcut into the Extended BASIC code. BASIC uses the lower area of RAM for a series of jump vectors (more commonly called "hooks"). These hooks allow a machine language program to alter the function of a ROM routine or even totally bypass the ROM routine. Two of these vectors are located at addresses 359 and 362 (each is three bytes long). The first of these vectors is used every time a character is to be displayed on the screen or sent to the printer. The second calls the keyboard scanning routine. Here are the hexadecimal and assembler values for these vectors:

```
7E 82 73    JMP $8273
7E 8C F1    JMP $8CF1
39          RTS
39          RTS
39          RTS
```

Notice that both of these jump addresses are in the Extended BASIC ROM address space ($8000 to $9FFF). After POKE 359,60 is executed, the disassembly looks like this:

```
3C 82       CWAI #$82
73 7E 8C    COM $7E8C
F1 39 39    CMPB $3939
39          RTS
```

As you can see, this new code is quite different from the original code. The real meat and potatoes part of this patch is the CWAI instruction. It tells the 6809 to stop executing instructions until an interrupt occurs. On the CoCo, this will be $\frac{1}{60}$th of a second at most, as the clock signal always interrupts BASIC 60 times each second. The net result is that BASIC will wait that long between each character, resulting in an effective baud rate of 600, or 60 characters per second.

You could add additional CWAIs to slow it down even more. The first glaring problem with this quick and dirty poke is that it doesn't preserve the vector's contents and do the jump after the interrupt. The second is that it depends on the contents of addresses 360 through 367 to have been initialized by Extended BASIC 1.1, not Disk BASIC.

The BASIC program shown below will enter a similar patch for any version of Extended or Disk BASIC. It has a further enhancement — it provides for four different speeds. In response to the Enter Speed prompt, you enter a number from 1 to 4. This is the number of interrupts the patch will wait between each character, resulting in speeds of 60, 30, 15 and 7.5 characters per second, respectively.

```
10 S = &HF3
20 INPUT "ENTER SPEED (1, 2, 3,
OR 4) ";I
30 FOR K = 1 TO I
40 POKE S, &H3C
50 POKE S+1, &HFF
60 S = S + 2
70 NEXT K
80 POKE S, PEEK(359)
90 POKE S+1, PEEK(360)
100 POKE S+2, PEEK(361)
110 POKE 360, &H00
120 POKE 361, &HF3
130 FOR X = 1 TO 10
140 PRINT "SEE IT WORKS"
150 NEXT X
160 NEW
```

Warning: Do not run this program more than once without either powering down the machine or restoring the original values for addresses 360 and 361.

For a quicker response, your questions may also be submitted through RAINBOW's CoCo SIG on Delphi. From the CoCo SIG> prompt, pick Rainbow Magazine Services, then, at the RAINBOW> prompt, type ASK **for "Ask the Experts" to arrive at the EXPERTS> prompt, where you can select the "Doctor ASCII" online form which has complete instructions.**

Barden's Buffer

Font Fascination

By William Barden, Jr.
Rainbow Contributing Editor

I am fascinated by fonts! In case you don't know this buzzword, a *font* is a typeface or character set, always containing the uppercase letters A through Z, the lowercase letters a through z, the digits 0 through 9, and special characters such as @ and #.

There are literally thousands of fonts in existence. Your typewriter probably uses a *Courier* font. Typewriters space in uniform increments, typically $^{1}/_{10}$-inch horizontally, rather than making the width of each character dependent on the size of the character, as does typesetting equipment.

Courier fonts tend to use characters that are padded out to fill up the $^{1}/_{10}$-inch space for narrow letters. Other fonts are *proportional fonts* — they allocate varying widths for each character based on the actual size of the letter. Take a look at the pages of RAINBOW and you'll see what I mean. The *Times Roman* type found here looks much better than type produced by a typical dot matrix printer. Times Roman type is often used for books and magazines, to increase readability. Bodoni, Century Schoolbook, Avant-Garde and thousands of other fonts are available to create type that is bold, sad, timid or heroic.

I don't know where I'd put CoCo type. It's not timid, but not heroic, either. It's just one of those typefaces that are used for equally spaced video characters. Want to play some games with the built-in font on your CoCo 3? It's easy to create your own characters and even steal other compatible fonts. The only catch is that you must have a CoCo 3 for these programs. The CoCo 3 has a high resolution graphics mode that allows text to be interspersed with graphics, and has a built-in character set for this purpose. The following programs will work on any CoCo 3. They use Extended BASIC rather than OS-9 BASIC09.

Bill Barden has written 27 books and over 100 magazine articles on various computer topics. His 20 years' experience in the industry covers a wide background: programming, systems analysis and managing projects for computers ranging from mainframes to micros.

CoCo 3 Hi-Res Text

Let's start first with the CoCo 3 high resolution mode. The CoCo 3 has capacity for these modes:

`HSCREEN 1` (320-by-192, four colors)
`HSCREEN 2` (320-by-192, 16 colors)
`HSCREEN 3` (640-by-192, two colors)
`HSCREEN 4` (640-by-192, four colors)

The numbers 320 and 640 refer to the number of dots across the screen in each row. The 192 refers to the number of rows up and down the screen. In 640-by-192 mode, there are a total of 122,880 dots on the screen, each of which can be programmed by high resolution graphics commands.

In high resolution graphics mode, you *must* use the 'H' commands. These are the high resolution modes that supplement the primary BASIC graphics commands. The format is very similar to the old graphics commands, however. Here's a recap of the commands available:

`HCIRCLE`	draws a circle like the Lo-Res `CIRCLE`
`HCLS`	clears the screen like the Lo-Res `CLS`
`HCOLOR`	sets graphics colors like Lo-Res `COLOR`
`HDRAW`	draws line segments like Lo-Res `DRAW`
`HLINE`	draws lines like Lo-Res `LINE`
`HPAINT`	fills an area with `PAINT` like Lo-Res `PAINT`
`HRESET`	resets a point like Lo-Res `PRESET`
`HSET`	sets a point like Lo-Res `PSET`
`HPOINT`	examines a point like Lo-Res `POINT`

CoCos 1 and 2 do not allow text to be displayed with graphics. If you set graphics mode, you have to construct your own character set and then display the characters at the proper point on the screen by pokes or `DRAW` statements, or some other method. This makes for a lot of tedious programming.

The CoCo 3, though, allows you to use a special command called `HPRINT`, which lets you print text anywhere on a high resolution graphics screen. The format of `HPRINT` is the following:

```
HPRINT (cp, row), "text"; . . , . . .
```

The `cp` value is a text character position of 0 through 39 or 0 through 79, depending on the screen mode. The row value is a text row value of 0 through 23. The data following the `cp` and row is a text string, variable name or other information, just as in a Lo-Res `PRINT` statement. To print, "This is the middle of the screen," superimposed over a circle for Hi-Res 640-by-194 four-color mode, for example, you'd have:

```
100 HSCREEN 4
110 HCIRCLE (320, 96),20
120 HPRINT (24, 12), "This is the middle of the
screen"
130 GOTO 130
```

Actually, the text will be a little offset toward the bottom of the screen, because there are an even number of text rows on the screen. However, lowercase characters will be displayed in addition to uppercase characters and the text will be superimposed over the circle.

You can intermix text and graphics in this manner for any screens you want to draw. The text becomes an integral part of the graphics data and will be erased or overwritten by graphics and new text.

The `HSCREEN` command *is* a little picky, however. It will print a string such as `"This is a string" + CHR$(32) + "and so is this"` without problems. You can also use commands such as `HPRINT (10,10), A$`. However, items separated by commas or semicolons will give syntax errors. `HPRINT (10,12), "This is "; "a string"` is not handled by `HPRINT`, for example. Use a plus sign (+) to concatenate strings or `CHR$` values.

Another thing to keep in mind with `HPRINT` is that characters `HPRINT`Ted in 640-by-192 resolution mode are one-half the width of the characters `HPRINT`Ted in 320-by-192 resolution mode. In 320-by-192 mode, 40 characters are allowed across the screen, while in 640-by-192 mode, 80 characters are allowed.

Where's That Character Set?

I knew the character set was in RAM somewhere. I was saved from having to search for it by Spectrum Projects' *CoCo 3 Secrets Revealed*, a handy 36-page document about CoCo 3 memory mapping and modes. It listed the character set at locations &HF09D through &HF39C, and that's where it was. The `HPRINT` character set looks like Figure 1. There are 96 characters, each represented by eight bytes, for a total of 96 * 8 = 768 bytes.

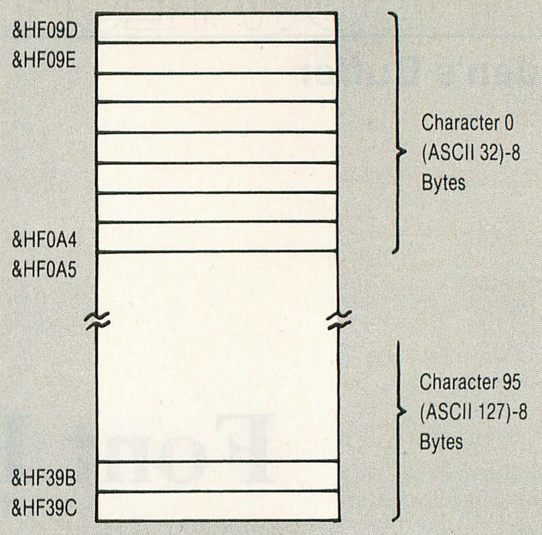

Figure 1: HPRINT Character Table

To see how the characters are generated, try the following program. It first prints all available `HPRINT` characters at the top of the screen. Next, it enlarges a character by printing an uppercase 'O' for each bit of the character. Since a character takes up 8-by-8 bits on a 640-by-192 screen, the character is enlarged 64 times. The proportions are off — the character appears elongated, but you can see the individual dots making up the character.

To use this short program, enter a character value from 32 through 127 and the character data from the character table will be displayed at screen center. The value corresponds to the ASCII code for the character. You won't be able to see the values you input, however. `INPUT` values are displayed only on a text screen. Just enter a two-digit value and watch the screen change for the corresponding character. To view a new character, enter another value.

```
100 HSCREEN 4
110 HCLS
120 FOR I=32 TO 127
130 IF I<80 THEN HPRINT (I-16,0)
,CHR$(I) ELSE HPRINT (I-64,1),CH
R$(I)
140 NEXT I
150 INPUT CH
160 HLINE ( 280, 60 ) - ( 360, 1
40 ), PRESET, BF
170 CH = (CH - 32)*8 + &HF09D
180 FOR I= 0 TO 7
190 CV = PEEK ( CH + I )
200 FOR J=7 TO 0 STEP -1
210 IF (CV AND (INT(2^J))) <> 0
THEN HPRINT ( 44 - J, 8 + I ), "
O"
220 NEXT J
230 NEXT I
240 GOTO 150
```

How the Program Works

The program has two parts. The first part is a loop from `I=32` to `I=127`. The values of `I` are the ASCII codes for the characters from a space to an escape. Two lines of characters are printed. If `I` is less then 80, the character is printed at `I-16` and Line 0, which spreads the characters over character position 32-16=16 to 79-16=63. If `I` is greater than 79, the character is printed at `I-64` and Row 1, which spreads the character over character position 80-64=16 to 127-64=63.

The second part of the program uses `HLINE` to draw a filled-in box, clearing any previous character in the center of the screen. (Remember that graphics will overwrite the `HPRINT` characters.) But, prior to that, a character value is input — a value of 32 to 127, which represents the ASCII code of the character. A value of 32 is then subtracted from this code to find the position in the character table at &HF09D, starting from 0. The result is multiplied by eight because each character in the table is made up of eight bytes. The 34th character (ASCII code 65, an A) would start at &HF09D + 34*8.

Because each character is made up of eight bytes, control variable `I` sets up a loop of eight iterations. Each time through the loop, a new byte from the character table is read into `CV`. This byte is made up of eight bits, each bit defining a single dot for the character. The byte is scanned from left to right by means of a second control variable, `J`. Using `J` as an exponent for a power of 2 results in "mask values" of 128, 64, 32, 16, 8, 4, 2 and 1.

These values are `AND`ed with the byte value read from the table. If the `AND` is not 0, the bit representing a pixel is set in the value, and an 'O' is written to the screen center. The `HPRINT` statement prints the 'O' in one of the 64 positions (row, column) depending on the current `I` and `J`. This process is repeated 64 times to construct the entire character in enlarged format.

Defining Your Own Characters

Since the character table for `HPRINT` is in RAM (random access, or read-write memory) and not ROM (read-only memory), the character data can be changed. Memory locations in RAM can be changed by a poke function. Of course, you have to be careful to poke the right places, otherwise chaos can result. As long as we stick to changing the characters in the `HPRINT` character table, though, everything should be fine.

Try this code to see what I mean:

```
100 HSCREEN 4
110 HCLS
120 FOR I = &HF09D + 33*8 TO &HF09D + (33*8) + 7
130 POKE I,244
140 NEXT I
150 HPRINT (0,0),"AAAAAAAAAAAAAAA"
160 GOTO 160
```

If you entered this code correctly, you will see a stripe pattern in the upper-left corner of the screen. This pattern replaces the 'A' character definition in the `HPRINT` character table. The decimal value 244 is 11001100 in binary. The bits in a byte represent horizontal pixels in 640-by-192 mode. Looking at the binary value, you can see how the ones and zeros alternate, producing a stripe.

Instead of a simple stripe pattern, though, we'd like to enter a series of dots that define a character. There are several ways to do this. First, you can simply load "over" the table with data defining a new character set. Where to get the character set? Any character set that uses an 8-by-8 pixel character can be used. Although it's probably heresy to suggest it in these pages, one of these is the Tandy 1000 character set.

The Tandy 1000 Character Set

The 1000's character set uses an 8-by-8 pixel character with a format different from that of the CoCo 3 `HPRINT` characters. There are 256 different characters defined for the Tandy 1000 set — 128 "standard" ASCII characters in codes 0 through 127, and 128 "extended" characters in codes 128 through 255.

The standard characters include upper- and lowercase alphabetic characters, digits and special characters. They also include the displayable control characters found on PC compatibles, codes in the 0 to 31 range that display happy faces, card suits, musical notes and others.

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The extended character set includes foreign characters such as an umlaut, texture characters (like newspaper halftones), block graphics, mathematical symbols and line segments. The line segments are especially nice, as they allow you to construct forms or simple diagrams without using graphics commands.

Listing 1, lines 10000 through 10255, shows a complete listing of the Tandy 1000 character set from codes 0 to 255. These codes were acquired by peeking into the Tandy 1000 character tables. There are two such tables, one for codes 0 through 127 and one for codes 128 through 255.

Each peek resulted in one byte of the eight bytes required for the character. An entire character is represented by eight bytes. The eight bytes for each character were converted to eight DATA values. For each of the 256 codes, a DATA line was generated consisting of a line number from 10000 through 10255, the word "DATA" and the eight code values with interspersed commas. These ASCII (text) lines were output to a sequential file on the Tandy 1000 MS-DOS disk. This file was copied onto a CoCo 3 disk using *CoCo Util II* (Mark Data Products). On the CoCo 3 side, the file was read in as a straight BASIC program. The character code, by the way, is contained in the line number. Line number 10044 holds the character definition for ASCII character 44, for example.

How do you make use of the Tandy 1000 characters? Only 96 characters can be displayed at one time in the HPRINT mode of the CoCo 3. However, once the characters have been read into the CoCo, it's a simple matter to switch back and forth among the 256 characters by reloading the character table. The remainder of the program in Listing 1 does this.

A Character Load/Switch Program

The middle part of the program, from Line 8000 on, is the Character Load/Switch code. It switches back and forth between selected character sets, either the original CoCo set or three segments of the Tandy 1000 set.

To save memory, the 352 characters of the original set and Tandy 1000 set (256 plus 96) are saved in a string array called

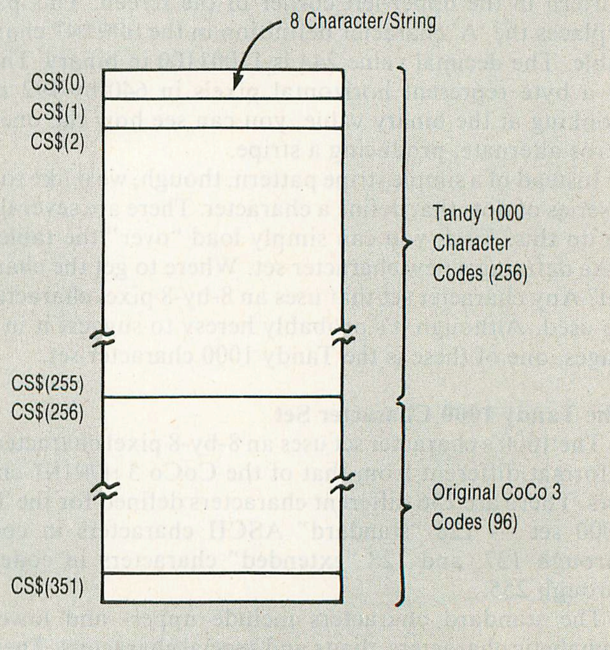


Figure 2: CS$ Character Array

`CS$`. It may seem a little strange to save character codes in a string array, but numeric variables take up six bytes each. With numeric variables, 6*8*352 = 16,896 bytes would be used to store the complete character set. With a string array, though, each byte can be put into a single character by using a `CHR$` function. The result is about 8*352 = 2,816 bytes of storage. (I say "about" here because additional bytes are required to define the array and strings.)

`CS$` is made up of 352 entries, with each entry holding the codes for one character, as shown in Figure 2. The first 256 entries hold the Tandy 1000 character set. The last 96 entries hold the character codes for the original CoCo characters. Once the character table is overwritten, the original codes are destroyed, and it's necessary to save the codes if you want to use them instead of the Tandy 1000 codes.

The code at 8000 first peeks at the 96 characters of the original set. An eight-byte string is built for each character, in `A$`. This string is stored in `CS$(256)` through `CS$(351)`, depending on the code.

The code then reads the Tandy 1000 `DATA` values, eight at a time. For each eight, another string `A$` is constructed, which is stored in `CS$(0)` through `CS$(255)`, depending on the ASCII code. Once this task is done, arrays `CS$(0)` through `CS$(351)` contain 352 strings, each string of length eight and representing one character in `CHR$()` format.

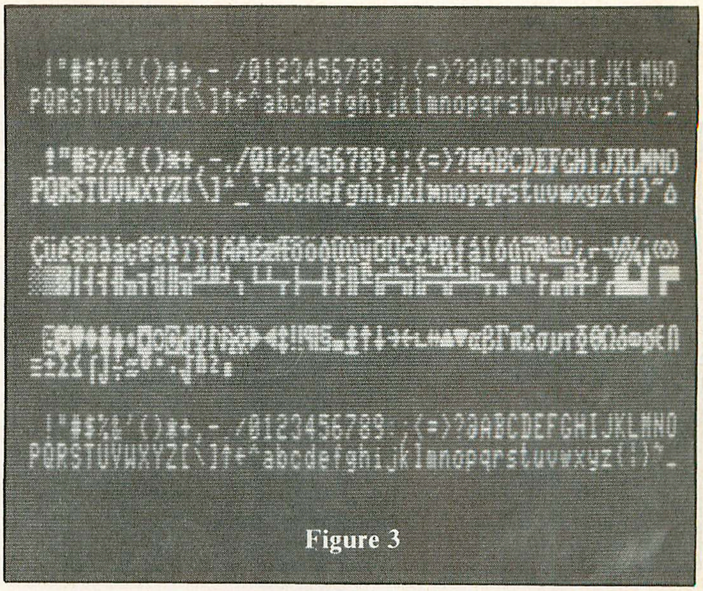
The code starting at 9000 is used to switch between character sets. There are four subroutine calls, which bring in one of four character sets:

`GOSUB 9100` — loads character codes 32 through 127 of the Tandy 1000 character set. These codes start with a space (32) and contain the upper- and lowercase alphabet, digits and special characters. They are displayed by simply using the text to be written in an `HPRINT` statement. Doing an `HPRINT (10,16), "This is text 0123"`, for example, displays that text in Line 16, character position 16, but in Tandy 1000 format.

`GOSUB 9200` — loads character codes 128 through 223 of the Tandy 1000 character set. These codes start with foreign characters such as umlaut and the yen sign. Fractions and "texture" characters follow. Line segments are next, followed by five block graphics characters. Doing an `HPRINT (10,16), "ABCDEFG"` displays Tandy 1000 character codes for 129 through 135 in place of the `ABCDEFG`.

`GOSUB 9300` — loads character codes 0 through 31 and 224 through 255 of the Tandy 1000 into the first 64 characters of the character table. The codes from 0 through 31 are *control codes* that display as happy faces, card suits, musical notes, etc. The codes from 224 through 255 are the Greek alphabet, mathematical symbols, and others. Doing an `HPRINT (10,16), "ABCDEFG"` displays Tandy 1000 codes 1 through 7 — happy faces and others. Doing an `HPRINT (10,16), "abcdefg"` displays Tandy 1000 codes 225 through 231, seven Greek letters.

`GOSUB 9400` — loads the original character codes back into the `HSCREEN` character table. The characters now display with `HPRINT` as before.



```
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO
PQRSTUVWXYZ[\]↑←'abcdefghijklmnopqrstuvwxyz{|}~_

 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO
PQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~⌂

 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO
PQRSTUVWXYZ[\]↑←'abcdefghijklmnopqrstuvwxyz{|}~_
```

Figure 3

Character Set Display

Figure 3 shows an actual display of the character sets. The character set in the top two lines and the bottom two lines are the original CoCo characters. The bottom two lines were restored by a `GOSUB 9400`. Lines 3 and 4 are the 96 Tandy 1000 characters from space (32) to escape (127). Notice how bold they are in comparison to the CoCo character set. Most of the characters use a double-line thickness for vertical lines. These characters were written after a `GOSUB 9100`. Lines 5 and 6 are the 96 Tandy 1000 characters from a Serbo-Croatian 'C' (128) to the last block graphics character (223). Line segment characters are included here. Lines 7 and 8 are the 64 Tandy 1000 characters from a null (0) and cursor down (31) and from a Greek alpha (224) through blank FF (255).

The "driver" for this display is shown in the first part of the code of the listing, `CHAR1000`. This code gives you an example of how the Load/Switch program is called. The first part of the code constructs two 48-character strings, `A$` and `B$`. `A$` contains character codes from 32 to 79, while `B$` contains character codes from 80 to 127. `A$` and `B$` are used in the `HPRINT` statements following to print the character set in force. There are four `GOSUB`s to select character sets 1, 2, 3 and a return to the original.

Designing Your Own Characters

The same method used in dumping the Tandy 1000 character set and in loading selected portions of it can be used in your own character definitions. Just substitute your own characters for any of the 256 characters in the Tandy character set defined by lines 10000 through 10255 in the code above.

A Bullet Example

Suppose you wanted to define a "bullet," which is a small filled-in circle used to highlight text. To design a bullet, you'd start with an 8-by-8 matrix, as shown in Figure 4. Each box in the matrix is 2 units wide by 1 unit high to compensate for the screen proportions of 640-by-192. (192 vertical pixels are held in 6 inches while 640 horizontal pixels are held in 10 inches. If the screen were square, 320 vertical pixels could be held in 10 inches. The ratio is therefore 2:1.) However, if you'll be using 320-by-192 mode, use a matrix with square boxes. We'll use the square (320-by-192) matrix here.

Draw the figure in the matrix. Some rough edges are necessary. Now convert to eight code values. The column “weights” of the matrix from left to right are 128, 64, 32, 16, 8, 4, 2 and 1. For each filled-in box, add the weight to the total weight. The first row is 16+8=24. The next row is 32+16+8+4=60. You'll have eight code values after you're done. These go into the `DATA` statement for the appropriate ASCII code. To replace an escape code with a bullet, for example, your `DATA` statement would look like this:

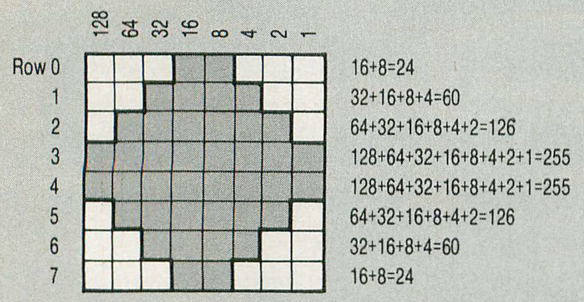


Figure 4: Designing a “Bullet”

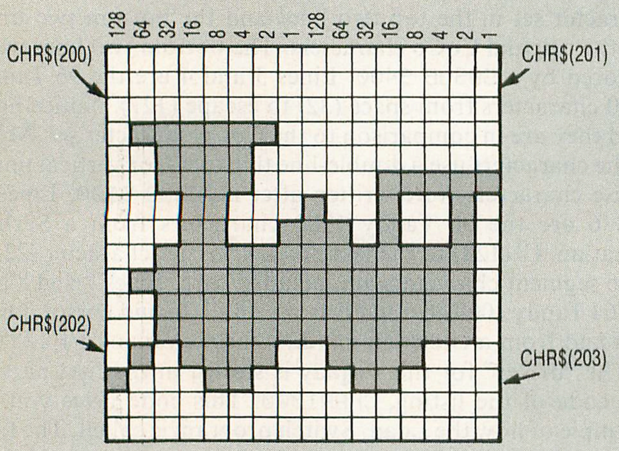


Figure 5: A Multiple-Character Symbol

```
10127 DATA 24,60,126,255,255,126,60,24
```

Thereafter, any time an escape code (127) is used, you'd display a bullet. For example:

```
1000 HPRINT (10,16), CHR$(127)+" Preceding
Bullet"
```

Multiple Character Symbols

Another trick you might want to try is to define multi-part symbols. By dividing a symbol into quadrants, you can split up a symbol into four characters or more. The complete symbol can then be displayed by `HPRINT`ing four or more characters. Suppose you had the symbol shown in Figure 5, split into four segments. The four sets of `DATA` values would be:

```
10200 DATA 0,0,0,126,60,60,24,24
10201 DATA 0,0,0,0,0,31,146,210
10202 DATA 63,127,63,63,94,140,0,0
10203 DATA 126,126,126,126,120,48,0,0
```

The symbol would be displayed by:

```
2000 HPRINT (10,11),CHR$(200)+CHR$(201)
2010 HPRINT (10,12),CHR$(202)+CHR$(203)
```

There are a lot more tricks and techniques that can be applied to the `HPRINT` character table — things like enlarging characters from table definitions and providing a font generator for easy character construction. We'll look at some of them in a future column. In the meantime, I hope you'll try the Tandy 1000 character set on your CoCo. It will save you a lot of work defining some interesting characters that you can use with your graphics. If you have your own fonts defined, pass them along and I'll include them in a future column. ☐

330	74	10123	177
8140	243	10141	86
10003	238	10155	173
10018	203	10173	236
10038	158	10187	89
10054	189	10216	20
10074	88	10232	96
10088	129	END	135
10108	15		

The listing: `CHAR1000`

```
100 ' Sample Driver for Characte
r Load/Switch Program
110 '-----------------------------
-------------------------------
-------------
120 '
130 CLEAR 5000
140 GOSUB 8010
150 HSCREEN 4
160 HCOLOR 0,3
170 HCLS
180 A$ = "": B$ = ""
190 FOR I = 32 TO 79
200 A$ = A$ + CHR$( I )
210 NEXT I
220 FOR I = 80 TO 127
230 B$ = B$ + CHR$( I )
240 NEXT I
250 HPRINT ( 16, 5 ), A$
260 HPRINT ( 16, 6 ), B$
270 GOSUB 9000
          'CS 1
280 HPRINT ( 16, 8 ), A$
290 HPRINT ( 16, 9 ), B$
```

```
300 GOSUB 9200
         'CS 2
310 HPRINT ( 16, 11 ), A$
320 HPRINT ( 16, 12 ), B$
330 GOSUB 9300
         'CS 3
340 HPRINT ( 16, 14 ), A$
350 HPRINT ( 16, 15 ), LEFT$( B$
, 16 )
360 GOSUB 9400
         'original
370 HPRINT ( 16, 17 ), A$
380 HPRINT ( 16, 18 ), B$
390 GOTO 390
400 '
8000 '-------------------------
--------------------------------
-------------
8010 ' Character Load/Switch Pro
gram - Incorporate in your own c
ode
8020 '
8030 DIM CS$( 351 )
8040 FOR I = 0 TO 95
8050 A$ = ""
8060 FOR J = 0 TO 7
8070 A$ = A$ + CHR$( PEEK( &HF09
D + I*8 + J ))
8080 NEXT J
8090 CS$( 256 + I) = A$
8100 PRINT ".";
8110 NEXT I
8120 FOR I = 0 TO 255
8130 A$ = ""
8140 FOR J = 0 TO 7
8150 READ A: A$ = A$ + CHR$( A )
8160 NEXT J
8170 CS$( I ) = A$
8180 PRINT ".";
8190 NEXT I
8200 RETURN
8210 '
9000 ' LOAD CSX
9100 ST = 32: EN = 127: OF = 0
9110 FOR ZI=ST TO EN: ZA$=CS$(ZI
):FOR ZJ=0 TO 7: POKE &HF09D + (
OF+ZJ),ASC(MID$(ZA$,ZJ+1,1)): NE
XT ZJ: OF=OF + 8:  NEXT ZI
9120 RETURN
9200 ST = 128: EN = 223: OF = 0:
 GOTO 9110
9300 ST = 0: EN = 31: OF = 0: GO
SUB 9110: ST = 224: EN = 255: OF
 = 32*8:  GOTO 9110
9400 ST = 256: EN = 351: OF = 0:
 GOTO 9110
9996 '
9997 '-------------------------
```

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```
------------------------------------
--------------
9998 ' Table of T1000 Characters
9999 '
10000 DATA 0,0,0,0,0,0,0,0
10001 DATA 126,129,165,129,189,1
53,129,126
10002 DATA 126,255,219,255,195,2
31,255,126
10003 DATA 54,127,127,127,62,28,
8,0
10004 DATA 8,28,62,127,62,28,8,0
10005 DATA 28,62,28,127,127,62,2
8,62
10006 DATA 8,8,28,62,127,62,28,6
2
10007 DATA 0,0,24,60,60,24,0,0
10008 DATA 255,255,231,195,195,2
31,255,255
10009 DATA 0,60,102,66,66,102,60
,0
10010 DATA 255,195,153,189,189,1
53,195,255
10011 DATA 15,7,15,125,204,204,2
04,120
10012 DATA 60,102,102,102,60,24,
126,24
10013 DATA 48,60,51,49,49,112,11
2,0
10014 DATA 96,120,102,115,111,22
7,231,7
10015 DATA 153,90,60,231,231,60,
90,153
10016 DATA 64,112,124,127,124,11
2,64,0
10017 DATA 1,7,31,127,31,7,1,0
10018 DATA 24,60,126,24,24,126,6
0,24
10019 DATA 102,102,102,102,102,0
,102,0
10020 DATA 127,219,219,123,27,27
,27,0
10021 DATA 63,96,62,99,62,3,126,
0
10022 DATA 0,0,0,0,126,126,126,0
10023 DATA 24,60,126,24,126,60,2
4,255
10024 DATA 24,60,126,24,24,24,24
,0
10025 DATA 24,24,24,24,126,60,24
,0
10026 DATA 0,12,6,127,6,12,0,0
10027 DATA 0,24,48,127,48,24,0,0
10028 DATA 0,0,96,96,96,127,0,0
10029 DATA 0,36,102,255,102,36,0
,0
10030 DATA 0,24,60,126,255,255,0
,0
10031 DATA 0,255,255,126,60,24,0
,0
10032 DATA 0,0,0,0,0,0,0,0
```

```
10033 DATA 24,60,60,24,24,0,24,0
10034 DATA 54,54,54,0,0,0,0,0
10035 DATA 54,54,127,54,127,54,5
4,0
10036 DATA 24,62,96,60,6,124,24,
0
10037 DATA 0,99,102,12,24,51,99,
0
10038 DATA 28,54,28,59,110,102,5
9,0
10039 DATA 24,24,48,0,0,0,0,0
10040 DATA 12,24,48,48,48,24,12,
0
10041 DATA 48,24,12,12,12,24,48,
0
10042 DATA 0,102,60,255,60,102,0
,0
10043 DATA 0,24,24,126,24,24,0,0
10044 DATA 0,0,0,0,0,24,24,48
10045 DATA 0,0,0,126,0,0,0,0
10046 DATA 0,0,0,0,0,24,24,0
10047 DATA 3,6,12,24,48,96,192,0
10048 DATA 62,99,103,111,123,115
,62,0
10049 DATA 24,56,24,24,24,24,126
,0
10050 DATA 60,102,6,28,48,102,12
6,0
10051 DATA 60,102,6,28,6,102,60,
0
10052 DATA 14,30,54,102,127,6,15
,0
10053 DATA 126,96,124,6,6,102,60
,0
10054 DATA 28,48,96,124,102,102,
60,0
10055 DATA 126,102,6,12,24,24,24
,0
10056 DATA 60,102,102,60,102,102
,60,0
10057 DATA 60,102,102,62,6,12,56
,0
10058 DATA 0,24,24,0,0,24,24,0
10059 DATA 0,24,24,0,0,24,24,48
10060 DATA 6,12,24,48,24,12,6,0
10061 DATA 0,0,126,0,126,0,0,0
10062 DATA 48,24,12,6,12,24,48,0
10063 DATA 60,102,6,12,24,0,24,0
10064 DATA 62,99,111,111,111,96,
60,0
10065 DATA 28,54,99,99,127,99,99
,0
10066 DATA 126,51,51,62,51,51,12
6,0
10067 DATA 30,51,96,96,96,51,30,
0
10068 DATA 124,54,51,51,51,54,12
4,0
10069 DATA 127,49,52,60,52,49,12
7,0
10070 DATA 127,49,52,60,52,48,12
```

```
0,0
10071 DATA 30,51,96,96,103,51,31
,0
10072 DATA 102,102,102,126,102,1
02,102,0
10073 DATA 60,24,24,24,24,24,60,
0
10074 DATA 15,6,6,6,102,102,60,0
10075 DATA 115,51,54,60,54,51,11
5,0
10076 DATA 120,48,48,48,49,51,12
7,0
10077 DATA 99,119,127,127,107,99
,99,0
10078 DATA 99,115,123,111,103,99
,99,0
10079 DATA 62,99,99,99,99,99,62,
0
10080 DATA 126,51,51,62,48,48,12
0,0
10081 DATA 62,99,99,99,99,111,62
,3
10082 DATA 126,51,51,62,54,51,11
5,0
10083 DATA 60,102,112,56,14,102,
60,0
10084 DATA 126,90,24,24,24,24,60
,0
10085 DATA 99,99,99,99,99,99,62,
0
10086 DATA 102,102,102,102,102,6
0,24,0
10087 DATA 99,99,99,107,127,119,
99,0
10088 DATA 99,99,54,28,28,54,99,
0
10089 DATA 102,102,102,60,24,24,
60,0
10090 DATA 127,99,70,12,25,51,12
7,0
10091 DATA 60,48,48,48,48,48,60,
0
10092 DATA 96,48,24,12,6,3,1,0
10093 DATA 60,12,12,12,12,12,60,
0
10094 DATA 8,28,54,0,0,0,0,0
10095 DATA 0,0,0,0,0,0,0,255
10096 DATA 24,24,12,0,0,0,0,0
10097 DATA 0,0,60,6,62,102,59,0
10098 DATA 112,48,62,51,51,51,11
0,0
10099 DATA 0,0,60,102,96,102,60,
0
10100 DATA 14,6,62,102,102,102,5
9,0
10101 DATA 0,0,60,102,126,96,60,
0
10102 DATA 28,54,48,120,48,48,12
0,0
10103 DATA 0,0,59,102,102,62,6,1
24
10104 DATA 112,48,54,59,51,51,11
5,0
10105 DATA 24,0,56,24,24,24,60,0
10106 DATA 6,0,14,6,6,102,102,60
10107 DATA 112,48,51,54,60,54,11
5,0
10108 DATA 56,24,24,24,24,24,60,
0
10109 DATA 0,0,230,127,127,107,9
9,0
10110 DATA 0,0,110,51,51,51,51,0
10111 DATA 0,0,60,102,102,102,60
,0
10112 DATA 0,0,110,51,51,62,48,1
20
10113 DATA 0,0,59,102,102,62,6,1
5
10114 DATA 0,0,110,59,51,48,120,
0
10115 DATA 0,0,62,96,60,6,124,0
10116 DATA 16,48,124,48,48,54,28
,0
10117 DATA 0,0,102,102,102,102,5
9,0
10118 DATA 0,0,102,102,102,60,24
,0
10119 DATA 0,0,99,107,127,127,54
,0
10120 DATA 0,0,99,54,28,54,99,0
```

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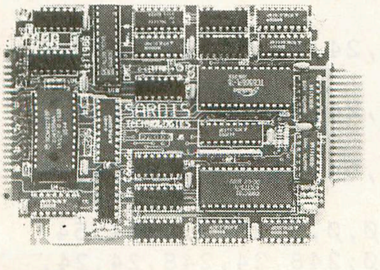

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```
10121 DATA 0,0,102,102,102,62,6,
124
10122 DATA 0,0,126,76,24,50,126,
0
10123 DATA 14,24,24,112,24,24,14
,0
10124 DATA 24,24,24,0,24,24,24,0
10125 DATA 112,24,24,14,24,24,11
2,0
10126 DATA 59,110,0,0,0,0,0,0
10127 DATA 0,8,28,54,99,99,127,0
10128 DATA 30,51,96,96,96,51,30,
12
10129 DATA 102,0,102,102,102,102
,59,0
10130 DATA 12,24,60,102,126,96,6
0,0
10131 DATA 60,195,60,6,62,102,63
,0
10132 DATA 102,0,60,6,62,102,63,
0
10133 DATA 48,24,60,6,62,102,63,
0
10134 DATA 24,0,60,6,62,102,63,0
10135 DATA 0,0,60,102,96,102,60,
24
10136 DATA 60,195,60,102,126,96,
60,0
10137 DATA 102,0,60,102,126,96,6
0,0
10138 DATA 48,24,60,102,126,96,6
0,0
10139 DATA 102,0,56,24,24,24,60,
0
10140 DATA 56,198,56,24,24,24,60
,0
10141 DATA 48,24,56,24,24,24,60,
0
10142 DATA 99,28,54,99,127,99,99
,0
10143 DATA 28,28,62,99,127,99,99
,0
10144 DATA 6,12,127,49,60,49,127
,0
10145 DATA 0,0,126,27,126,216,12
6,0
10146 DATA 63,108,204,255,204,20
4,207,0
10147 DATA 60,195,60,102,102,102
,60,0
10148 DATA 102,0,60,102,102,102,
60,0
10149 DATA 48,24,60,102,102,102,
60,0
10150 DATA 60,195,102,102,102,10
2,59,0
10151 DATA 48,24,102,102,102,102
,59,0
10152 DATA 102,0,102,102,102,62,
6,124
10153 DATA 99,62,99,99,99,99,62,
0
10154 DATA 54,99,99,99,99,99,62,
0
10155 DATA 12,12,63,96,96,63,12,
12
10156 DATA 28,54,50,120,48,115,1
26,0
10157 DATA 102,102,60,126,24,126
,24,24
10158 DATA 248,204,204,250,198,2
07,198,199
10159 DATA 14,24,24,60,24,24,24,
112
10160 DATA 12,24,60,6,62,102,63,
0
10161 DATA 24,48,56,24,24,24,60,
0
10162 DATA 12,24,60,102,102,102,
60,0
10163 DATA 12,24,102,102,102,102
,59,0
10164 DATA 59,111,0,110,51,51,51
,0
10165 DATA 118,222,115,123,111,1
03,99,0
10166 DATA 60,6,62,102,59,0,255,
0
10167 DATA 60,102,102,102,60,0,2
55,0
10168 DATA 0,24,0,24,48,96,102,6
0
10169 DATA 0,0,0,126,96,96,0,0
10170 DATA 0,0,0,126,6,6,0,0
10171 DATA 195,198,204,222,51,10
2,204,15
10172 DATA 195,198,204,216,55,11
1,207,3
10173 DATA 0,24,0,24,24,60,60,24
10174 DATA 0,51,102,204,102,51,0
,0
10175 DATA 0,204,102,51,102,204,
0,0
10176 DATA 34,136,34,136,34,136,
34,136
10177 DATA 85,170,85,170,85,170,
85,170
10178 DATA 219,119,219,238,219,1
19,219,238
10179 DATA 24,24,24,24,24,24,24,
24
10180 DATA 24,24,24,24,248,24,24
,24
10181 DATA 24,24,248,24,248,24,2
4,24
10182 DATA 54,54,54,54,246,54,54
,54
10183 DATA 0,0,0,0,254,54,54,54
10184 DATA 0,0,248,24,248,24,24,
24
10185 DATA 54,54,246,6,246,54,54
,54
```

```
10186 DATA 54,54,54,54,54,54,54,
54
10187 DATA 0,0,254,6,246,54,54,5
4
10188 DATA 54,54,246,6,254,0,0,0
10189 DATA 54,54,54,54,254,0,0,0
10190 DATA 24,24,248,24,248,0,0,
0
10191 DATA 0,0,0,0,248,24,24,24
10192 DATA 24,24,24,24,31,0,0,0
10193 DATA 24,24,24,24,255,0,0,0
10194 DATA 0,0,0,0,255,24,24,24
10195 DATA 24,24,24,24,31,24,24,
24
10196 DATA 0,0,0,0,255,0,0,0
10197 DATA 24,24,24,24,255,24,24
,24
10198 DATA 24,24,31,24,31,24,24,
24
10199 DATA 54,54,54,54,55,54,54,
54
10200 DATA 54,54,55,48,63,0,0,0
10201 DATA 0,0,63,48,55,54,54,54
10202 DATA 54,54,247,0,255,0,0,0
10203 DATA 0,0,255,0,247,54,54,5
4
10204 DATA 54,54,55,48,55,54,54,
54
10205 DATA 0,0,255,0,255,0,0,0
10206 DATA 54,54,247,0,247,54,54
,54
10207 DATA 24,24,255,0,255,0,0,0
10208 DATA 54,54,54,54,255,0,0,0
10209 DATA 0,0,255,0,255,24,24,2
4
10210 DATA 0,0,0,0,255,54,54,54
10211 DATA 54,54,54,54,63,0,0,0
10212 DATA 24,24,31,24,31,0,0,0
10213 DATA 0,0,31,24,31,24,24,24
10214 DATA 0,0,0,0,63,54,54,54
10215 DATA 54,54,54,54,255,54,54
,54
10216 DATA 24,24,255,24,255,24,2
4,24
10217 DATA 24,24,24,24,248,0,0,0
10218 DATA 0,0,0,0,31,24,24,24
10219 DATA 255,255,255,255,255,2
55,255,255
10220 DATA 0,0,0,0,255,255,255,2
55
10221 DATA 240,240,240,240,240,2
40,240,240
10222 DATA 15,15,15,15,15,15,15,
15
10223 DATA 255,255,255,255,0,0,0
,0
10224 DATA 0,0,59,110,100,110,59
,0
10225 DATA 60,102,102,124,99,99,
110,96
10226 DATA 127,51,49,48,48,48,12
0,0
10227 DATA 0,0,127,54,54,54,51,0
10228 DATA 126,102,48,24,48,102,
126,0
10229 DATA 0,0,63,102,102,102,60
,0
10230 DATA 0,0,51,51,51,51,62,96
10231 DATA 0,0,126,152,24,24,24,
0
10232 DATA 126,24,60,102,102,60,
24,126
10233 DATA 28,54,99,127,99,54,28
,0
10234 DATA 60,102,195,195,195,10
2,231,0
10235 DATA 14,24,12,62,102,102,6
0,0
10236 DATA 0,0,126,219,219,126,0
,0
10237 DATA 0,3,62,103,107,115,62
,96
10238 DATA 28,48,96,124,96,48,28
,0
10239 DATA 60,102,102,102,102,10
2,102,0
10240 DATA 0,126,0,126,0,126,0,0
10241 DATA 0,24,126,24,0,126,0,0
10242 DATA 48,24,12,24,48,126,0,
0
10243 DATA 12,24,48,24,12,126,0,
0
10244 DATA 7,12,12,12,12,12,12,1
2
10245 DATA 12,12,12,12,12,108,10
8,56
10246 DATA 24,24,0,126,0,24,24,0
10247 DATA 0,59,110,0,59,110,0,0
10248 DATA 28,54,54,28,0,0,0,0
10249 DATA 0,28,28,0,0,0,0,0
10250 DATA 0,0,0,24,24,0,0,0
10251 DATA 15,12,12,12,236,108,6
0,28
10252 DATA 60,54,54,54,54,0,0,0
10253 DATA 56,12,24,48,60,0,0,0
10254 DATA 0,0,60,60,60,60,0,0
10255 DATA 0,0,0,0,0,0,0,0
10256 '-------------------------
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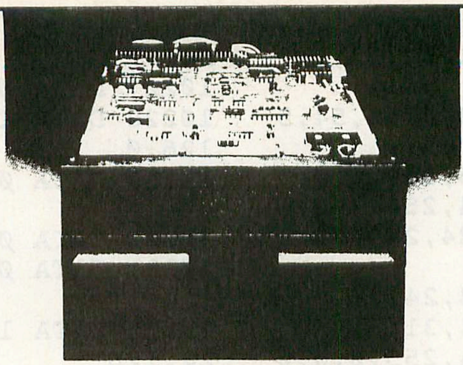

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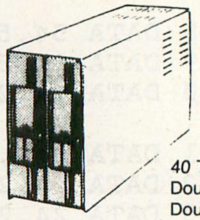

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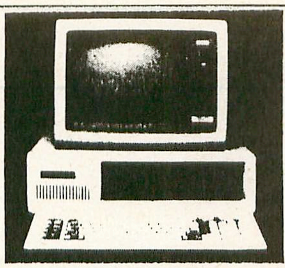

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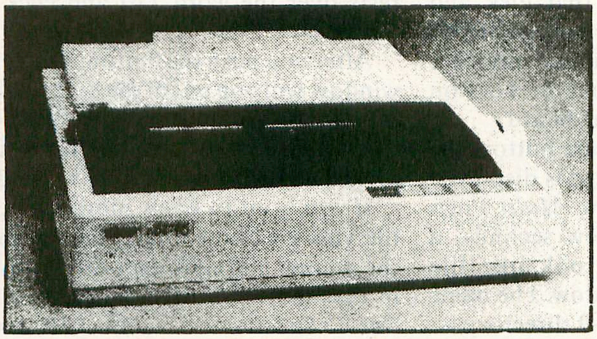

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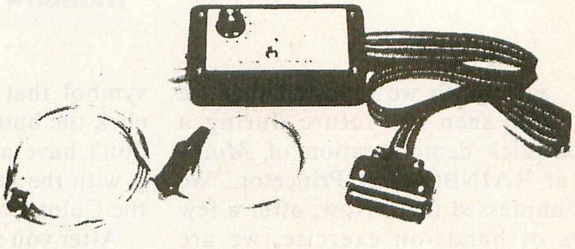

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KISSable OS-9

A View of *Multi-Vue*

By Dale L. Puckett
Rainbow Contributing Editor

Last month we reported that we had seen the future during a quick demonstration of *Multi-Vue* at RAINBOWfest Princeton. We were impressed then. Now, after a few hours of hands-on exercise, we are ready to pronounce the future *has arrived.* Indeed, it would not be an exaggeration to proclaim that if *Multi-Vue* had been around when OS-9 arrived in 1983, this column probably wouldn't have been needed.

Multi-Vue uses a visual metaphor to reduce the complexity of OS-9. Long OS-9 pathlists are often hard to remember — especially for a beginner. *Multi-Vue* replaces those pathlists with pictures. Instead of remembering a pathlist to a file on a disk drive or other hardware device must begin with a slash (/), you need only remember a disk drive is a rectangular box with an opening in the front.

Finding Files

If you want to find a file on a floppy or hard disk with *Multi-Vue*, you simply point to the icon or graphic symbol that represents that disk and click the button on your mouse. If you don't have a mouse, you can simulate it with the arrow and function keys on the Color Computer 3 keyboard.

After you click the mouse button, the name of the device selected is displayed in a title bar just below *Multi-Vue*'s main menu bar. In a few seconds, a number of icons that look like file folders appear in the window. The name of each folder — or OS-9 directory — appears below each folder. To find out what is stored in one of these folders, you must move the mouse pointer to the folder and click twice. After you click, icons that represent any additional folders, documents or application programs appear in the window. The complete OS-9 pathlist to that directory appears in the title bar at the top of the window.

Essentially, when you run your Color Computer 3 with *Multi-Vue*, you select an object by pointing to it and clicking the mouse button. Then, you act on the object you selected by picking a verb from one of the pull-down menus at the top of your screen.

For example, to list a text file to your screen, you point to its icon — a small picture that looks like a piece of paper with the top right-hand corner folded over. You then move the mouse until the pointer rests above the word *Files* and click the button. A shadowed box with a menu suddenly pops down from the menu bar and remains in place. You can then move the mouse until the pointer rests over the word *List* and click the button.

After you push the button, an overlay window will pop out of the bottom third of your screen and OS-9 will list your file. It will pause and wait for you to press a key every time it fills the window.

If you want to know more about the file you selected earlier, you can move the pointer and click over the word *Stat* in the file menu. Stat is similar to the `Get Info` command on the Macintosh. It shows you the name of the file and the number of the owner, and tells you when the file was first created and last modified. It also displays several additional file attributes. For example, it will tell you if you can read from or write to the file. It tells you if it contains executable code and also how many bytes are stored in the file.

After you select a document or file, you can use any of the commands in the menu that *Multi-Vue* has enabled. For example, if you have selected a text file, you will be able to list it, copy it, delete it, get information about it, print it or rename it. You will not be able to open it. On the other hand, if you have selected a file or document that contains executable object code, you will only be able to copy, delete, get information about or rename it. You will not be able to list or print it.

Multi-Vue knows what it can do with the file or document you select because it reads the OS-9 attributes set on the file when it was created. It tells you what it can do by highlighting the commands

---

Dale L. Puckett, who is author of The Official BASIC09 Tour Guide *and co-author, with Peter Dibble, of* The Complete Rainbow Guide to OS-9, *is a free-lance writer and programmer. He serves as director-at-large of the OS-9 Users Group and is a member of the Computer Press Association. Dale is a U.S. Coast Guard lieutenant and lives in Rockville, Maryland.*

you can select. For example, when you select a file that contains executable code, the list and print choices on the menu appear dim.

A Nice Shortcut

There are two ways to run an application program using *Multi-Vue*. First, if you see an icon that looks like an open window, the file contains executable program code. To run that program you must first select the document and then move the mouse to the files menu and click on the word *Open*.

If the application you want to run has its own icon, you will be able to take a nice shortcut. In this case, you simply point to the icon and click twice. *Multi-Vue* will run the program for you automatically. You will not have to go to the file menu and click Open. Unfortunately, it does not have command key shortcuts for common menu commands like Open, Print, etc.

This shortcut can also be used with a document that was created by an application program with its own icon. For example, after you have created an application information file and an icon for your word processor, any document you save with the same three-letter extension as the AIF file will also be displayed with the word processor's icon. If you "double click" on one of the documents with that icon, *Multi-Vue* automatically loads your word processor and then opens your document.

Other Choices

The file menu is only one of four *Multi-Vue* menus you may use while running your Color Computer 3. With the Disk menu, you can find out the amount of free space available on a floppy or hard disk, create a new folder — or OS-9 directory, format a new disk, back up an old disk, set your current execution directory or add new devices to your *Multi-Vue* desktop.

> ***"While* Multi-Vue *makes OS-9 power available to the masses, hackers won't need to worry about their elite status. There's plenty there for them, also."***

With the View menu, you can choose between an 80-column text display and eight folders displayed per row in the Hi-Res mode or 40-column text and four folders displayed in a row in the Lo-Res mode. With either choice you get three rows of documents or folders.

The 'X' Must Mean Multitasking

If you click over the 'X' on *Multi-Vue*'s menu bar, you open another window of opportunity. Remember what a hassle it used to be to set the attributes on your serial or printer port? Or even worse, how many times have you found yourself writing a BASIC09 program with `GetStat` or `SetStat` system calls to set the key-repeat delay or speed? These hassles are gone when you use *Multi-Vue*'s 'X' menu. Actually, the *Multi-Vue* manual calls this icon the "Tandy" menu and if you look closely you'll notice the top and bottom of the 'X' are closed.

From the Tandy menu you can also start a clock, use a decimal/hexadecimal calculator or work with a built-in calendar to keep track of your schedule. Later, OS-9 application programs will be released that make use of the clipboard standard built into *Multi-Vue*. This means that in the future you will be able to cut a selection of text or a drawing out of one document and paste it in another. With a little luck and additional standards, we may someday be able to paste drawings in our word processing documents and vice versa.

I strongly encourage the OS-9 Users Group to establish a standards committee and create a *Multi-Vue* clipboard standard immediately. If the Users Group doesn't act, I certainly hope that several major Color Computer OS-9 software developers will join forces long enough to publish a standard. Without a workable *Multi-Vue* clipboard standard, CoCo OS-9 users will never have the ability to cut and paste text data and graphics images between applications. We need this ability if OS-9 is to realize its potential in today's market. May the users force the issue!

Multi-Vue Manual Is Hacker's Heaven

While *Multi-Vue* makes OS-9 power available to the masses, hackers won't need to worry about their elite status. There's plenty there for them, also. In fact, the information in the back of the *Multi-Vue* manual is a gold mine. With it, we can all learn what makes a windowing system like `WindInt.IO` tick.

We'll learn about window types and learn how to create framed windows with scroll bars, plain framed windows, windows with shadowed boxes, windows with a double box and windows with a plain box. We'll learn about "regions" and what to do with the information revealed by them. And we'll learn how to design our own menu bars and add pull-down menu support to our programs.

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All diskettes are in CoCo OS-9 format; other OS-9 formats can be supplied for $2.00 additional charge. All orders must be prepaid or COD, VISA/MC accepted, add $1.50 S&H for software, $5.00 for CCRD, additional charge for COD.

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Hint . . .

M/L Autostart

You can quickly make a machine language program autostart (and restart) by including the following statements at the appropriate place in your program:

```
ORG $0182
JMP execad
```

The `execad` is the execution address of the program. After this, the program will start itself after loading. It will also restart when the reset button is pressed.

David Mills
Huntington, WV

One-Liner Contest Winner . . .

Does your dungeon need cleaning? Make things a little more organized in your D&D games with this one-liner, which generates a printed chart to help you keep track of your character's qualities.

The listing:

```
6 Z$=STRING$(80,"-"):A$=CHR$(138
)+CHR$(138):INPUT"NAME";N$:PRINT
#-2,CHR$(&HE)N$A$Z$:PRINT#-2,"ST
R:"A$"INT:"A$"WIS:"A$"DEX:"A$"CO
N:"A$"CHA:"A$A$"HIT PTS:"A$"ARM
CLASS:"A$"MONEY:"A$Z$"EQUIPMENT
CARRIED":FORT=1TO5:PRINT#-2,A$:N
EXT:PRINT#-2,Z$"OTHER NOTES
```

Keith Schuler
Merritt Island, FL

(For this winning one-liner contest entry, the author has been sent copies of both *The Third Rainbow Book of Adventures* and its companion *The Third Rainbow Adventures Tape.*)

Also in the back of the *Multi-Vue* manual, C programmers will find the long-awaited documentation to the CGFX library that comes with the Program Development Package. In it, they'll find the definitions for the high-level windowing environment and the structure definitions needed to access it.

One note of caution is in order with *Multi-Vue*. As you build your first working disks, make sure you do not name any files with a period followed by a three-letter extension, e.g., `.TXT` or `.BIN`. `GShell`, the graphics shell in *Multi-Vue*, seems to suffer from a conflict between these files and *Multi-Vue*'s Application Information Files (AIF) and tends to hang up if it encounters them in a directory. Be careful.

When you install *Multi-Vue*, follow the directions in the manual carefully and you shouldn't have any trouble. Be sure you use the original OS-9 system disk and not one you have modified with non-standard modules when you generate your new *Multi-Vue* system. *Multi-Vue* will work with hard disks, RAM disks or just about any other RBF device that has the proper device descriptor and device driver installed. However, the script file provided on the *Multi-Vue* release disk expects to find the standard set of Tandy OS-9 modules.

If you are an OS-9 veteran, feel free to generate a *Multi-Vue* system start-up disk that works with your hardware. Just use the `OS9Gen` utility with your own bootlist file. That's the method I used to generate my system disk and it worked like a charm from the start.

PhantomGraph Appears Promising

Tandy released one of the most useful business tools available on the Color Computer last month. *PhantomGraph* is Fort Worth's answer to the old axiom, "One picture is worth a thousand words." With it, you can convert numerical data from your *DynaCalc* spreadsheet into a pictorial form that is easy to understand. If you don't have *DynaCalc*, you can still plot your data with *PhantomGraph.*

The type of chart you need depends on the data you want to explain. *PhantomGraph* lets you present line graphs, bar charts, pie charts and scatter charts. The program is easy to install — you simply copy it into your current execution directory, `/D0/CMDS`. Once it is in place, you run it by typing `pg`.

PhantomGraph uses pull-down menus to make your plotting easy. Its four menus include Files, Drawing, Graph and Utilities. Graph lets you pick the color of your charts, enter your data, draw the charts and add titles to your work. To enter data into *PhantomGraph*, you use the Data item under the Graph menu. You simply move an arrow into a blank area of the screen and type in the numbers. This method works quite well for simple charts but would be very tedious if you had a lot of data to handle. When large charts and graphs are required, the *DynaCalc/PhantomGraph* link is in order.

To link the data from *DynaCalc* into a *PhantomGraph* chart, you use a special utility program supplied with *PhantomGraph.* The program, called *Dyna*, converts the spreadsheet files into *PhantomGraph* files.

To make a chart this way, enter your data into a *DynaCalc* spreadsheet and save it using the *DynaCalc* S#S option. After this is done, call *Dyna* from the *PhantomGraph* Utility menu and let it make the conversion. When the data window appears, the conversion is complete.

Next, click the mouse button with the pointer off the data window to get back to *PhantomGraph* proper. At this point, you can call up the Graph menu, set your chart type and add your titles. This done, you open the converted file from the file menu, select Draw from the Graph menu and you'll soon be looking at your new chart.

If you have a few spreadsheets that were saved in the *Sylk* format on your MS-DOS machine at the office, you can also use *PhantomGraph* to display charts made from them. A special utility program supplied with *PhantomGraph* will convert your *Sylk* files to *DynaCalc* files. Once you have them in this familiar format you can make as many charts as you need.

OS-9 Users Group Active Again

Dave Kaleita, a long-time veteran of the OS-9 Users Group, has become the group's president following Bill Turner's resignation from that office. Turner must be thanked for his long hours and yeoman efforts to get the group back on its feet after administrative details had been neglected far too long by his predecessor.

Kaleita, who is noted for his managerial ability, seems to be getting the ball rolling again. As I was finishing this column, Bill Brady (*Wiz* author and new *MOTD* editor) had just sent a new issue of the group's newsletter to the printer. He hopes to repeat that task every two months. The issue contains a ballot, and, for the first time, the OS-9 Users Group will elect its officers by mail. Those ballots must be returned to the Users Group's post office box in Tampa, Florida, by March 1. The names of the new officers will be announced in the May/June issue of *MOTD*.

The slate includes Kaleita for president, Pete Lyall for vice president, George Dorner for treasurer and Kevin Darling for secretary. I cannot praise Kaleita highly enough for the outstanding work he did when he served as the group's software librarian while I was president several years ago. The same goes for George Dorner, who is probably responsible for keeping me sane. Without his extremely hard work and outstanding help I never would have made it through the two terms. Kevin Darling and Pete Lyall are both extremely well-known — Pete for his hard work as an assistant SysOp on CompuServe's OS-9 SIG, and Kevin for his continuous and outstanding help to newcomers on RAINBOW's OS-9 Online SIG on Delphi. They will both serve the group well.

Again, let me go to bat for this new round of volunteers and encourage you to help them keep the group alive. Four officers alone do not a Users Group make. The group is yours. These guys are just trying to manage the group so it will be there to serve you. They cannot do the job alone — even though they will certainly try.

They need your articles for *MOTD*, your programs for the software exchange library and your support when they hold an event near you. If you buy only one or two disks from the software library in a year, you will have recouped the money you paid in dues.

The library archive now contains 11 80-track, double-sided disks, and you can buy the entire set from the group for $100. The software is also distributed on 56 individual disks and includes more than 300 programs. You can order individual disks in the Color Computer format for $6 each directly from the OS-9 Users Group at their Tampa address.

If you are in a hurry, you can get immediate service by ordering them by telephone from FHL in Syracuse, New York. FHL charges $10 for this service and pays a royalty to the Users Group for each disk sold. Consult the latest edition of *MOTD* for a listing of the group's library.

Kaleita also announced the names of several of the group's committees. He is asking George Dorner, Bill Turner, Steve Odneal and Bill Brady to join him on the finance committee. The membership committee will include Kevin Darling, Dave Kaleita, Pete Lyall, George Dorner and Bill Turner. Pete Lyall, Dave Kaleita, George Dorner, Kevin Darling and I will serve on the public relations committee. The newsletter committee will include Bill Brady, Kevin Darling, Pete Lyall, Greg Morse and Bert Schneider. The software exchange committee will include Carl Kreider, Dave Kaleita and Bert Schneider. And, finally, the communications committee will include George Dorner, Bill Brady, Pete Lyall and Greg Law.

The address for disk orders, renewals, or volunteers is OS-9 Users Group, Suite R-237, 1715 East Fowler Avenue, Tampa, FL 33612.

The UG Software Library, Part II

Last month we showed you how easy it is to use a fourth-generation database program like *Sculptor* to tackle a large database like the OS-9 Users Group's Software Exchange Library. These new database languages actually write their own programs after you tell them what the data looks like. However, large projects with dozens of databases can easily get out of hand. That's the topic of this month's discussion.

After years of working with *Sculptor*, Frank Hogg finds it takes him only a few minutes to write most programs. Yet, he sometimes spends weeks planning his databases. He told us if he had to write equivalent programs in C or BASIC, it would probably take him several months. The example programs we showed you last month took him less than 20 minutes.

The question, then, is how to go about planning a large database. The first step is a thorough examination of the problem and the data. When we left Hogg pondering the solution last month, he had a database that was already defined.

He started his enhancement by adding a new field where he could store the number of sectors required to hold each program. This additional field will make it easier to rearrange disks in the future. Then he asked another question. Is there anything else that might be needed in the database? If so, he wanted

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to add the new fields immediately *before writing a number* of additional programs to manipulate the data.

Hogg wanted to include a way to find things in the database with a keyword search. For example, a communications program might have keywords like XModem, Kermit, Comm, etc. He added that *ability* quickly. But editing or deleting a record made maintaining the keyword database messy. He needed a cleaner method to maintain the keywords.

At first he thought he could limit the keywords to some fixed number — maybe five — and then add the keywords to the main database. If he did this, the keyword database could be made up of just the index without the data, which would make the program quicker. The only negative aspect about this approach was the predetermined limit. The file would get a little larger, but it's a small file, anyway.

Next, Hogg thought about a double keyword file — one with the keyword first and one with the title first. He could then find the keywords quickly by looking at the titles. It sounded like a kludge, but the idea wasn't that bad. The inserting, deleting and amending process would take twice as long, but if there were five keywords it would still take only one or two seconds. That wouldn't be a problem.

The size wouldn't be a problem either. In fact, the total disk space would be less because space would only be assigned to keyword records he needed. His first approach had required the keywords be assigned a space in the main database where the space would be reserved whether it was actually used or not.

These alternative solutions all pose interesting questions. Hopefully, they will give you some idea about what you should look at when you plan your next database. Remember, you must look at more than one aspect of the problem. You must consider speed, disk usage, database maintenance and the complexity of the programs — as well as the needs of the database application itself.

As it turned out, the way Hogg wrote the program originally was the best way for this application — although it was a very crude way to accomplish the goal. It was also more than fast enough. It squarely met two of the most important criteria.

The only slow area in the application was the part used to delete and amend the records. Since these actions are rarely used in this application, the slower speed of these functions does not present a problem. Additionally, the program is easy to understand and allows any number of keywords in each main database record. The only thing it lacks is a way to delete individual keywords that may have been entered accidentally. The code in Figure 1 takes care of the job.

```
dk=delete keyword
check disk
message "Use BACKSPACE to finish inserting"
input k_keyword bs = END
k_title = u_title
find dkey
prompt "Are you sure" no = END
delete dkey
end
```

Figure 1

Other Database Considerations

In 1983, Hogg created a *Sculptor* invoicing program for FHL that uses six different databases to create each invoice. The main file is the customer database. One handy field in Hogg's customer database is the most recent invoice number. When the program finds a customer, it can then find the most recent invoice and display it. At the same time, the description of each item on the invoice is retrieved from another database.

Hogg added a field in each invoice that holds the next most recent invoice. This lets him step back through invoices that refer to a customer and see what he has purchased over the years. His forethought came in handy recently when he offered an upgrade to *DynaStar*, the firm's popular word processing program. His customers did not have to send in their original disks to upgrade. He was able to verify the fact that they were eligible for an upgrade by looking at their records when they called.

Everything worked fine with Hogg's database until last year when, after four years of 24-hour, seven-days-a-week service, the disk drive failed on his 6809-based Gimix III. And, as luck would have it, he did not have the system fully backed up. He recovered most of the data, but some of the old invoices got lost in the process.

Many of Hogg's invoices were in the middle of a chain and his database design did not have a provision for this occurrence. He lived with the situation for several months while trying to figure out an easy way to find the missing links to thousands of invoices. He decided he needed a forward link in the invoices and an additional field in the customer file that pointed to the beginning of the chain. With these additions, he could get to an invoice from either direction.

He began to make the changes during a four-day Thanksgiving weekend. At the same time, he moved the data over to one of his QT 68000 systems. He used *Sculptor*'s Reformat utility to copy the data over to another file with extra blank fields. Then he wrote a *Sculptor* program that went down each linked list, created a backward link and set up the customer files to point to the beginning of the chain. It took the better part of a day to run this program, but when it was through, he had solved most of his problems.

Hogg then wrote a simple program to update the invoice database and search for any invoices that weren't flagged by the previous program. He relinked these missing links and the job was done. It didn't take as long as he thought it would, but, as he remarked recently, "It wouldn't have had to be done if I had planned the database correctly in the first place."

Group Library Database Revisited

Sculptor is a nice database program, but not everyone owns it. Hogg needed to find a way to allow anyone to use his new Users Group Software database. Hogg solved the problem with a program named *Grep*, which can be found on UG Disk #13.

Grep is a text string search utility. It looks through a text file and prints any line that contains the search string. He decided to format a straight text file with data from the UG database that non-*Sculptor* users could search with *Grep*.

First, Hogg studied *Grep*. He found it prints each line that matches the search string. He also realized most terminals, including the CoCo 3, have an 80-column display.

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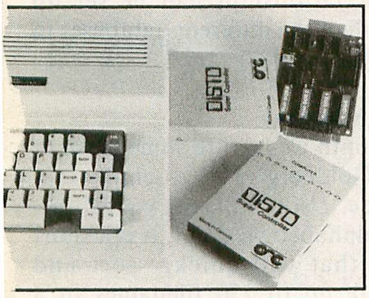

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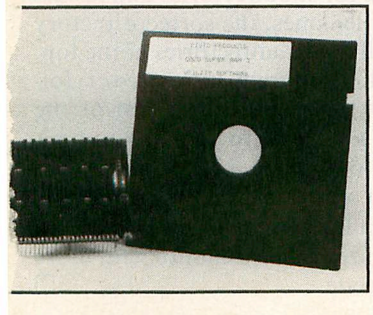

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He decided to let *Sculptor* create a text file in which each line contained all the data from a record. The line could be many screen lines long, but it would look good on the screen if he padded it with the proper number of spaces. Figure 2 shows the *Sculptor* program that created the *Grep* file.

The variable `tabit` is an integer number used to calculate the tab offset when printing from one to three lines of text. Remember that the disk file can have some blank lines in it. The index used in loops in *Sculptor* is `scrline`. In BASIC, the code would look like this:

```
FOR I=1 TO 3
 PRINT U_FUNCTION(I)
NEXT I
```

The scroll function is different because it does not require the parentheses. The *Sculptor* code takes some getting used to, but it saves a lot of typing. The scroll function makes more sense in screen programs, but it is also used in report programs for continuity.

Seeing the `end` statement probably suggests to you that the program will stop after printing just one record, but in *Sculptor*, `exit` is used to stop a program and `end` is used to tell *Sculptor* to get the next record. Here is how we make the file for use by *Grep*:

```
OS9: sagerep disk pvdu >
diskgrep
```

`Sagerep` is the *Sculptor* report program, `disk` is the program above and `pvdu` is the printer driver for the terminal — Hogg didn't want any printer control codes in the file. He used the `>diskgrep` in the command line to redirect the output of `sagerep` to a disk file named `diskgrep`. Here's how you use the file `diskgrep`: `OS9: grep grep diskgrep` or `OS9: grep GREP diskgrep`.

Another nice addition would be a report that shows the disks in volume number order. Hogg used a simple utility called `reformat` to rearrange the database.

Here are the descriptors for `voldisk`:

```
KEY FIELDS
 1:u_volume,,a2,
 2:u_title,,a20,
```

Notice he used the same field names but only two of them. A new index file is created by the command line `OS9: reformat disk voldisk`. Hogg then changed the `u_` to `v_` with the *Sculptor* `describe` utility.

The program below lists a file in the new order. The `driving` file is `voldisk`. Each time a record is retrieved in `voldisk`, *Sculptor* automatically looks up a record in `disk` with the key from `voldisk`.

```
!file 1 voldisk !xfile 2
disk key = v_title

print u_volume,u_title,u_
from
```

Here are the first few lines of output:

```
0 ATTR_CHG     WAGGONER, ROLAND T.
0 BOOTSPLIT     KREIDER, CARL R.
0 DDIR     SEATON, WM. GLENN
0 DLIST     KREIDER, CARL R.
0 DOCGEN3  KALEITA, DAVID L.
```

Sculptor works with up to 16 databases per program. Six can be open at a time. Relationships can be set up between all of the different databases in any way you choose!

Goldberg's Dsort

This month we feature some more of Stephen Goldberg's fine assembly language code. *Dsort* will sort your directories in alphabetical order. It is a short program that will quickly sort and consolidate up to 250 filenames in a directory.

Since *Dsort* is an ASCII sort, if you maintain the OS-9 convention of using uppercase for subdirectories and lowercase for filenames, the sorted directory will list all the subdirectories at the top. To use this program, type `Dsort` followed by the name or pathlist of the directory you want to sort. If you omit the directory name, the program will sort your current working directory.

That's it for March. Enjoy *Multi-Vue* and we'll see you next month with more tips and code. □

```
!file disk

!temp tabit,,i2

print "***** Title: ";u_title;" From: ";u_from;tab(80);
print "Size: ";u_size;" Ver: ";u_ver;" Lang: ";u_language;
print " Format: ";u_format;tab(160);
scroll 1 LOOP\
if u_function = "" then goto END_LOOP
tabit=160+(scrline*80)
print u_function;tab(tabit);
scroll
if scrline < 4 then goto LOOP END_LOOP\
print "Program Type: ";u_type;" Vol: ";u_volume;
print " Used? ";u_used
end
```

Figure 2

The listing: `Dsort`

```
************************************************************
*
* DSORT   -   COPYRIGHT (c) 1987 by S.B.GOLDBERG
*
* Use: dsort [directory]
*      Omit directory name for current directory
*
* Produces sorted disk directories of up to 250
* filenames.
*
        ifp1
        use     /d0/defs/os9defs
        endc
*
        mod     len,name,prgrm+objct,reent+1,entry,dsiz
*
```

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Please do not submit material currently submitted to another publication.

```
path     rmb    1   I/O path number
pointer  rmb    2   filename pointer
pointer2 rmb    2   comparison pointer
buffer   rmb    8000   directory buffer
         rmb    200   stack
         rmb    200   parameter
dsiz     equ    .
*
name     fcs    /dsort/
         fcb    1   edition number
         fcc    /(c)1987 S.B.Goldberg/
current  fcs    /./   current directory
******************************
*
* OPEN DIRECTORY
*
entry    decb   parameter?
         bne    open    yes, open directory
         leax   <current,pcr    no, current directory
open     lda    #updat.+dir.    update directory mode
         os9    i$open    open directory
         bcs    pass    exit with error
         sta    path    save path number
         bsr    skipdots    omit directory and parent
******************************
*
* GET DIRECTORY ENTRIES
*
         leax   buffer,u    directory buffer
getentry clr    ,x    end of buffer marker
         ldy    #32   length of entry
reread   os9    i$read    get entry
         bcs    error    branch on error
         tst    ,x    deleted file?
         beq    reread    yes, get next entry
         tfr    x,y    buffer pointer
endloop  ldb    ,y+    end of name?
         bpl    endloop    no, look some more
         andb   #%01111111    clear ms bit
         stb    -1,y    return to filename
         clr    ,y    end of name marker
         leax   32,x    bump pointer
         bra    getentry    get next entry
*
skipdots pshs   u    save 'U' register
         ldx    #0
         ldu    #64
         os9    i$seek    skip first 2 entries
pass     bcs    out    exit with error
         puls   u    retrieve 'U' register
         rts    return
*
error    cmpb   #e$eof    end of file?
         bne    out    exit with other error
         bsr    skipdots    reset directory pointer
******************************
*
* SORT DIRECTORY ENTRIES
*
```

```
sort     leax  buffer,u   buffer address
sort1    stx   pointer   save filename pointer
         leay  32,x   comparison filename
sort2    lda   ,x   first filename character
         beq   setend   end of sort
         bpl   sort4    not sorted, continue
sort3    tfr   y,x   already sorted
         bra   sort1    try again
sort4    tst   ,y   end of buffer?
         beq   output   yes, put in directory
         cmpa  ,y   compare
         bhi   sort3   no match, continue sort
         blo   lower2   no match, continue sort
         sty   pointer2   save comparison pointer
compare  lda   ,x+   filename character
         beq   lower   end of filename
         cmpa  ,y+   compare
         beq   compare   same look again
         blo   lower   no match, continue sort
         ldx   pointer2   new filename pointer
         bra   sort1   continue sort
lower    ldx   pointer   retrieve pointers
         ldy   pointer2
lower2   leay  32,y   new comparison
         bra   sort2   try again
***********************************
*
* OUTPUT SORTED ENTRIES
*
output   tfr   x,y   filename pointer
fixloop  ldd   ,y+   filename characters
         tstb   end of name?
         bne   fixloop   no, look some more
         ora   #%10000000   set ms bit
         sta   -1,y   return to filename
         lda   path   path number
         ldy   #32   length of entry
         os9   i$write   entry to directory
         bcs   out   exit with error
com      com   ,x   set sorted indicator
         bpl   com   do again if not set
         bra   sort   continue sort
***********************************
*
* TERMINATE DIRECTORY
*
setend   lda   path   path number
         ldb   #ss.pos   file pointer function
         os9   i$getstt   get pointer position
         bcs   out   exit with error
         ldb   #ss.size   file size function
         os9   i$setstt   set eof at pointer
         bcs   out   exit with error
         clrb   clear error
out      os9   f$exit   quit
*
         emod
len      equ   *
         end
```

About The One-Liner Contest . . .

THE RAINBOW's One-Liner Contest has now been expanded to include programs of either one or two lines. This means a new dimension and new opportunity for those who have "really neat" programs that simply just won't fit in one line.

Here are the guidelines: The program *must* work in Extended BASIC, have only one or two line numbers and be entirely self-contained — no loading other programs, no calling ROM routines, no poked-in machine language code. The program has to run when typed in directly (since that's how our readers will use it). Make sure your line, or lines, aren't packed so tightly that the program won't list completely. Finally, any instructions needed should be *very* short.

Send your entry (preferably on cassette or disk) to:

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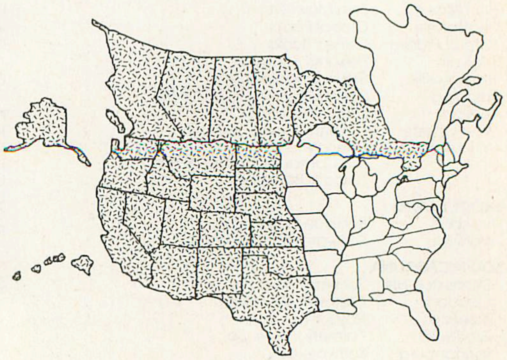

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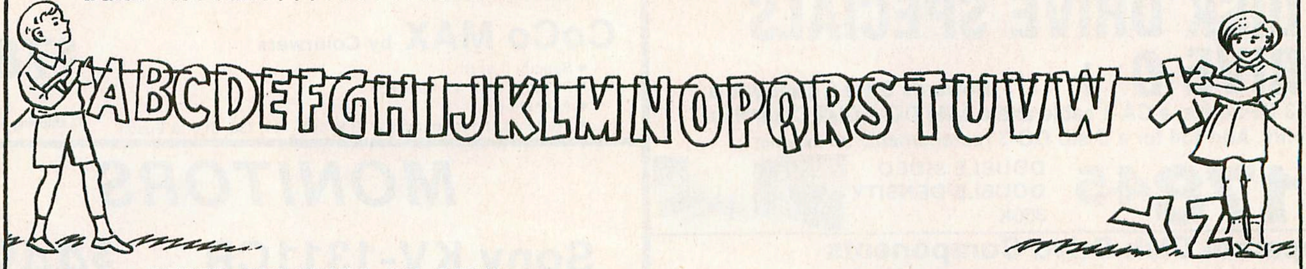

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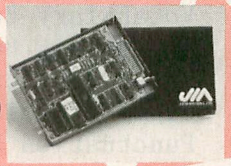

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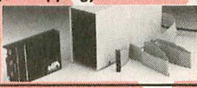

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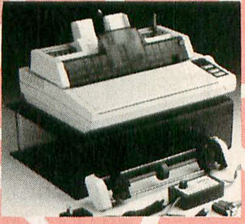

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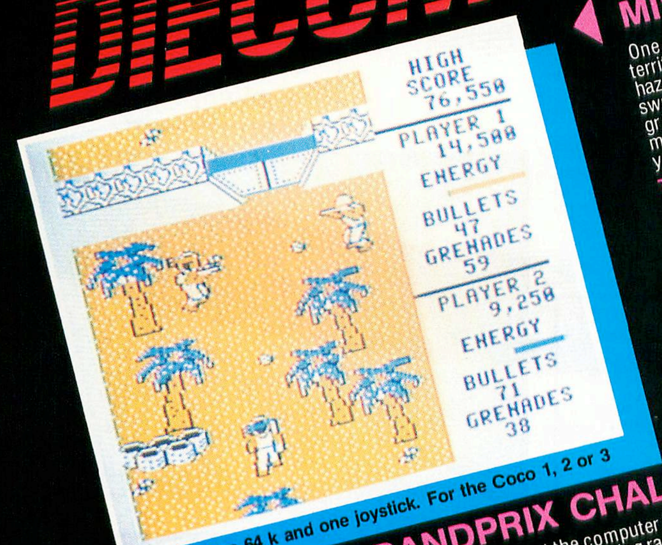

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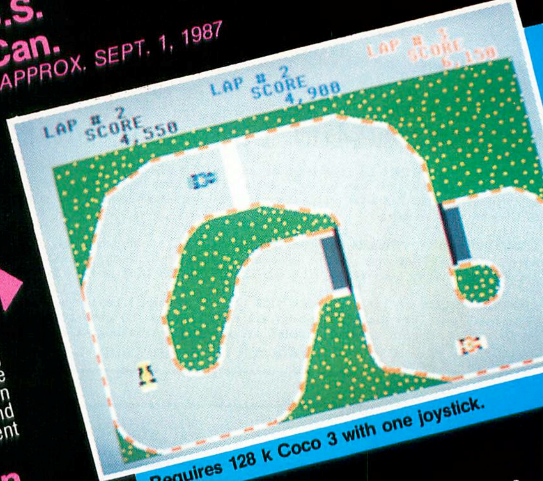

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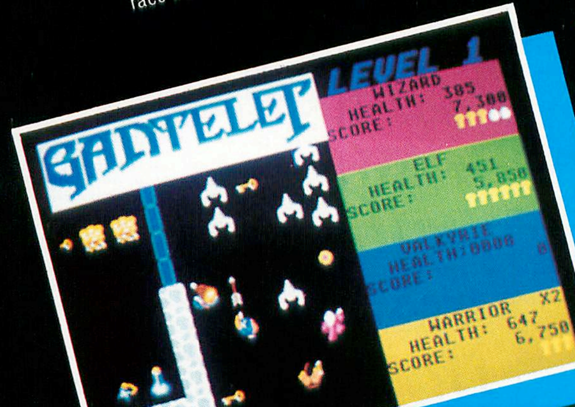
GANTELET
LEVEL 1
WIZARD HEALTH: 385 SCORE: 7,300
ELF HEALTH: 451 SCORE: 5,850
VALKYRIE HEALTH: 0000 SCORE:
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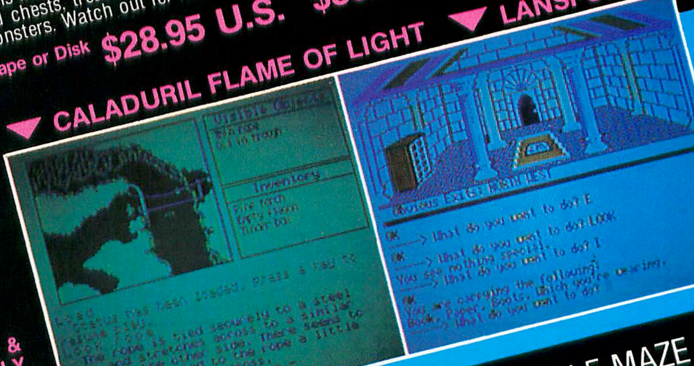

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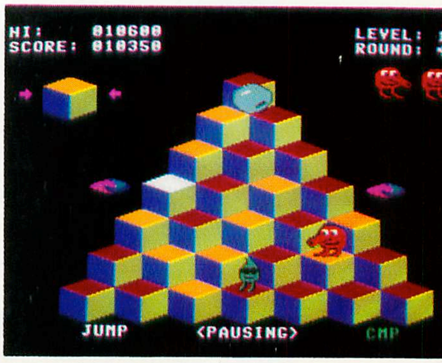

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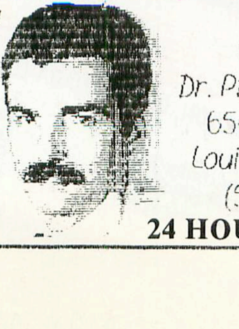

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